Nordstrom Contracting
Consulting Corp
36 Theills Mt Ivy Rd
Pomona, NY 10970

LETTER OF TRANSMITTAL

Project: 561A4-18-102
Correct FCA Deficiencies

11/04/2022

To: Gary Boehner
General Engineer
Lyons Campus
151 Knollcroft Rd
Lyons, NJ 07939

07- Division 06- Rough Carpentry

Submittal #

We are sending you [ ] Herewith [ ] Delivered by Hand [ ] Under Separate Cover [X] Via **ELECTRONIC**

[ ] Plans [ ] Prints [ ] Shop Dwgs [ ] Samples [ ] Specifications [X] Other _____

Copies	Item	# Pages	Description
			Division 061000- Rough Carpentr- Fasteners- Various
	1	1	Grip Rite- Drywall Screws- Various Sizes
	2	10	"Red Head" Concrete Anchors- Various types & Sizes
	3	4	Grip Rite Fasteners- Various- Depending on Application
	4	7	Ramset Fasteners- Various- Depending on Application

_____Approved

_____Approved with corrections as noted on submittal data and/or attached sheets(s)

Signature: _____

Title: _____

Date: _____

Drywall Screw

For attaching gypsum board to light-gauge steel studs. Made to conform to ASTM C1002.

SKU CHARTS COLOR CODING **Close all Charts (#)**

Drywall Screw - Phosphate Coated

Drywall

Size	Drive	Point	Thread	Bulk Carton Quantity	Approx. Count/ lb.	SKU
Phosphate Coated						
1 in. x 6	#2 Phillips	Sharp	Coarse	10M	313	1CDWS
1-1/8 in. x 6	#2 Phillips	Sharp	Coarse	10M	286	118CDWS
1-1/4 in. x 6	#2 Phillips	Sharp	Coarse	8M	258	114CDWS
1-1/2 in. x 6	#2 Phillips	Sharp	Coarse	6M	250	112CDWS
1-5/8 in. x 6	#2 Phillips	Sharp	Coarse	5M	200	158CDWS
2 in. x 6	#2 Phillips	Sharp	Coarse	3.5M	175	2CDWS
2-1/4 in. x 6	#2 Phillips	Sharp	Coarse	3M	136	214CDWS
2-1/2 in. x 8	#2 Phillips	Sharp	Coarse	2.5M	119	212CDWS
3 in. x 8	#2 Phillips	Sharp	Coarse	1M	83	3CDWS
3-1/2 in. x 10	#2 Phillips	Sharp	Coarse	1M	43	312CDWS
3-3/4 in. x 10	#2 Phillips	Sharp	Coarse	1M	43	334CDWS
4 in. x 10	#2 Phillips	Sharp	Coarse	1M	43	4CDWS
4-1/2 in. x 10	#2 Phillips	Sharp	Coarse	1M	42	412CDWS
5 in. x 10	#2 Phillips	Sharp	Coarse	1M	37	5CDWS
6 in. x 10	#2 Phillips	Sharp	Coarse	1M	32	6CDWS
1-1/4 in. x 6	#2 Phillips	Sharp	Coarse	8M	258	114SCDWS
1-5/8 in. x 6	#2 Phillips	Sharp	Coarse	5M	200	158SCDWS
2 in. x 6	#2 Phillips	Sharp	Coarse	3.5M	175	2SCDWS
2-1/2 in. x 8	#2 Phillips	Sharp	Coarse	2.5M	238	212SCDWS
3 in. x 8	#2 Phillips	Sharp	Coarse	2M	83	3SCDWS

Drywall Screw - Phosphate Coated Drywall

Drywall Screw - Phosphate Coated Specialty Screws

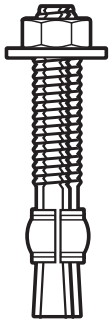
Drywall Screw - Zinc Plated Specialty Screws

Anchoring Selection Chart

RED HEAD®
Concrete Anchoring Solutions

Anchor Selection Chart		Adhesive Anchors				Screw Anchors			Expansion Anchors									Fric-tion
									Torque-Set					Hammer-Set				
		S7	C6+	A7	G5	LDT	Tapcon	E-Z Ancor	Trubolt	Trubolt+	Dynabolt	Boa Coil	Poly-Set	Drop-In	Stud	Hammer-Set	Redi-Drive
Base Material	Uncracked Concrete	S7	C6+	A7	G5	LDT	TAP		TRU	TRU+	DYNA	BOA		DROP	STUD	HAMM	REDI
	Cracked Concrete	S7	C6+		G5					TRU+							
	Lightweight Concrete								TRU	TRU+	DYNA			DROP			
	Lightweight Concrete on Metal Deck					LDT			TRU	TRU+				DROP			REDI
	Hollow Core Concrete													DROP			
	Grout Filled Concrete Block			A7		LDT					DYNA						REDI
	Hollow Concrete Block			A7		LDT	TAP				DYNA						REDI
	Solid Brick			A7													
	Drywall							E-Z									
Hole Conditions	Oversized Holes		C6+		G5												
	Water Saturated Concrete	S7	C6+	A7	G5	LDT	TAP		TRU	TRU+	DYNA	BOA		DROP	STUD	HAMM	REDI
	Water-filled Holes	S7	C6+	A7	G5	LDT	TAP		TRU	TRU+	DYNA	BOA		DROP	STUD	HAMM	REDI
	Submerged	S7	C6+	A7	G5												
	No Hole Cleaning Procedures							E-Z					POLY				
Application Requirements	Through Fixture Fastening	S7	C6+	A7	G5	LDT	TAP		TRU	TRU+	DYNA	BOA			STUD	HAMM	REDI
	Immediate Loading					LDT	TAP	E-Z	TRU	TRU+	DYNA	BOA	POLY	DROP	STUD	HAMM	REDI
	Finished Head or Flush Surface					LDT	TAP	E-Z			DYNA	BOA	POLY	DROP		HAMM	REDI
	Easy to Remove					LDT	TAP	E-Z				BOA	POLY				
	Seismic	S7	C6+		G5					TRU+							
	Cyclic Loading	S7	C6+	A7	G5				TRU	TRU+							
	High Temperature Resistance	S7	C6+	A7	G5	LDT	TAP		TRU	TRU+	DYNA	BOA		DROP	STUD	HAMM	REDI
	Sustained Load	S7	C6+		G5	LDT	TAP		TRU	TRU+	DYNA	BOA		DROP			REDI
Corrosion Resistance	Zinc Plated	S7	C6+	A7	G5			E-Z	TRU	TRU+	DYNA	BOA	POLY	DROP	STUD	HAMM	REDI
	Hot-Dipped Galvanized	S7	C6+	A7	G5				TRU								
	304 Stainless Steel	S7	C6+	A7	G5				TRU		DYNA						
	316 Stainless Steel	S7	C6+	A7	G5				TRU	TRU+				DROP			
	410 Stainless Steel	S7	C6+	A7	G5	LDT	TAP										
	Trade Secret Coating					LDT	TAP										
Anchor Diameters	3/16”						TAP	E-Z					POLY			HAMM	REDI
	1/4”						TAP		TRU		DYNA			DROP	STUD	HAMM	REDI
	5/16”						TAP				DYNA		POLY				
	3/8”	S7	C6+	A7	G5	LDT			TRU	TRU+	DYNA			DROP	STUD		
	1/2”	S7	C6+	A7	G5	LDT			TRU	TRU+	DYNA	BOA		DROP	STUD		
	5/8”	S7	C6+	A7	G5	LDT			TRU	TRU+	DYNA	BOA		DROP	STUD		
	3/4”	S7	C6+	A7	G5	LDT			TRU	TRU+	DYNA	BOA		DROP	STUD		
	7/8”	S7	C6+	A7	G5												
	1”	S7	C6+	A7	G5				TRU								
	1-1/4”	S7	C6+	A7	G5												
	Rebar Sizes	#3-8,10	#3-8,10	#3-11	#3-10												
At 70°F	Working Time (minutes)	4	11	6	15												
	Cure Time (minutes)	30	420	33	1440												

Trubolt Wedge



SPECIFIED FOR ANCHORAGE INTO CONCRETE

Trubolt Wedge anchors feature a stainless steel expansion clip, threaded stud body, nut and washer. Anchor bodies are made of plated carbon steel, hot-dipped galvanized carbon steel, type 304 stainless steel or type 316 stainless steel as identified in the drawings or other notations.

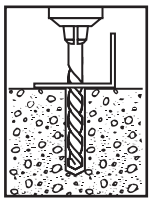
The exposed end of the anchor is stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

Use carbide tipped hammer drill bits made in accordance with ANSI B212.15-1994 to install anchors.

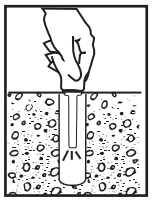
Anchors are tested to ACI 355.2 and ICC-ES AC193. Anchors are listed by the following agencies as required by the local building code: ICC-ES, UL, FM, City of Los Angeles, California State Fire Marshal and Caltrans.

See pages 42-43 for performance values in accordance to 2006 IBC.

INSTALLATION STEPS



1. Select a carbide drill bit with a diameter equal to the anchor diameter. Drill hole to any depth exceeding the desired embedment. See chart for minimum recommended embedment.



2. Clean hole or continue drilling additional depth to accommodate drill fines.

3. Assemble washer and nut, leaving nut flush with end of anchor to protect threads. Drive anchor through material to be fastened until washer is flush to surface of material.

4. Expand anchor by tightening nut 3-5 turns past the hand tight position, or to the specified torque requirement.

**** ONLY FOR USE IN CONCRETRE****

APPROVALS/LISTINGS

Trubolt®
Wedge Anchors

ICC Evaluation Service, Inc. # ESR-2251
- – Category 1 performance rating
- – 2006 IBC compliant
- – Meets ACI 318 ductility requirements
- – Tested in accordance with ACI 355.2 and ICC-ES AC193
- – For use in seismic zones A & B
- – 1/4", 3/8" & 1/2" diameter anchors listed in ESR-2251

Underwriters Laboratories
Factory Mutual
City of Los Angeles - #RR2748
California State Fire Marshall
Caltrans
Meets or exceeds U.S. Government G.S.A. Specification A-A-1923A Type 4 (formerlyGSA: FF-S-325 Group II, Type 4, Class 1)

LENGTH INDICATION CODE *

CODE	LENGTH OF ANCHOR		CODE	LENGTH OF ANCHOR	
A	1-1/2 < 2	(38.1 < 50.8)	K	6-1/2 < 7	(165.1 < 177.8)
B	2 < 2-1/2	(50.8 < 63.5)	L	7 < 7-1/2	(177.8 < 190.5)
C	2-1/2 < 3	(63.5 < 76.2)	M	7-1/2 < 8	(190.5 < 203.2)
D	3 < 3-1/2	(76.2 < 88.9)	N	8 < 8-1/2	(203.2 < 215.9)
E	3-1/2 < 4	(88.9 < 101.6)	O	8-1/2 < 9	(215.9 < 228.6)
F	4 < 4-1/2	(101.6 < 114.3)	P	9 < 9-1/2	(228.6 < 241.3)
G	4-1/2 < 5	(114.3 < 127.0)	Q	9-1/2 < 10	(241.3 < 254.0)
H	5 < 5-1/2	(127.0 < 139.7)	R	10 < 11	(254.0 < 279.4)
I	5-1/2 < 6	(139.7 < 152.4)	S	11 < 12	(279.4 < 304.8)
J	6 < 6-1/2	(152.4 < 165.1)	T	12 < 13	(304.8 < 330.2)

*Located on top of anchor for easy inspection.

PERFORMANCE TABLE

Trubolt Wedge Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Concrete*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	f'c = 2000 PSI (13.8 MPa)		f'c = 4000 PSI (27.6 MPa)		f'c = 6000 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)	4 (5.4)	1-1/8 (28.6)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	1,180 (5.2)	1,400 (6.2)	1,780 (7.9)	1,400 (6.2)	1,900 (8.5)	1,400 (6.2)
		1-15/16 (49.2)		2,100 (9.3)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)
		2-1/8 (54.0)		2,260 (10.1)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)	3,300 (14.7)	1,680 (7.5)
3/8 (9.5)	25 (33.9)	1-1/2 (38.1)		1,680 (7.5)	2,320 (10.3)	2,240 (10.0)	2,620 (11.7)	2,840 (12.6)	3,160 (14.1)
		3 (76.2)		3,480 (15.5)	4,000 (17.8)	5,940 (26.4)	4,140 (18.4)	6,120 (27.2)	4,500 (20.0)
		4 (101.6)		4,800 (21.4)	4,000 (17.8)	5,940 (26.4)	4,140 (18.4)	6,120 (27.2)	4,500 (20.0)
1/2 (12.7)	55 (74.6)	2-1/4 (57.2)		4,660 (20.7)	4,760 (21.2)	5,100 (22.7)	4,760 (21.2)	7,040 (31.3)	7,040 (31.3)
		4-1/8 (104.8)		4,660 (20.7)	7,240 (32.2)	9,640 (42.9)	7,240 (32.2)	10,820 (48.1)	8,160 (36.3)
		6 (152.4)		5,340 (23.8)	7,240 (32.2)	9,640 (42.9)	7,240 (32.2)	10,820 (48.1)	8,160 (36.3)
5/8 (15.9)	90 (122.0)	2-3/4 (69.9)		6,580 (29.3)	7,120 (31.7)	7,180 (31.9)	7,120 (31.7)	9,720 (43.2)	9,616 (42.8
		5-1/8 (130.2)		6,580 (29.3)	9,600 (42.7)	14,920 (66.4)	11,900 (52.9)	16,380 (72.9)	12,520 (55.7)
		7-1/2 (190.5)		7,060 (31.4)	9,600 (42.7)	15,020 (66.8)	11,900 (52.9)	16,380 (72.9)	12,520 (55.7)
3/4 (19.1)	110 (149.2)	3-1/4 (82.6)		7,120 (31.7)	10,120 (45.0)	10,840 (48.2)	13,720 (61.0)	13,300 (59.2)	15,980 (71.1)
		6-5/8 (168.3)		10,980 (48.8)	20,320 (90.4)	17,700 (78.7)	23,740 (105.6)	20,260 (90.1)	23,740 (105.6)
		10 (254.0)		10,980 (48.8)	20,320 (90.4)	17,880 (79.5)	23,740 (105.6)	23,580 (104.9)	23,740 (105.6)
7/8 (22.2)	250 (339.0)	3-3/4 (95.3)		9,520 (42.3)	13,160 (58.5)	14,740 (65.6)	16,580 (73.8)	17,420 (77.5)	19,160 (85.2)
		6-1/4 (158.8)		14,660 (65.2)	20,880 (92.9)	20,940 (93.1)	28,800 (128.1)	24,360 (108.4)	28,800 (128.1)
		8 (203.2)		14,660 (65.2)	20,880 (92.9)	20,940 (93.1)	28,800 (128.1)	24,360 (108.4)	28,800 (128.1)
1 (25.4)	300 (406.7)	4-1/2 (114.3)		13,940 (62.0)	16,080 (71.5)	20,180 (89.8)	22,820 (101.5)	21,180 (94.2)	24,480 (108.9)
		7-3/8 (187.3)		14,600 (64.9)	28,680 (127.6)	23,980 (106.7)	37,940 (168.8)	33,260 (148.0)	38,080 (169.4)
		9-1/2 (241.3)		18,700 (83.2)	28,680 (127.6)	26,540 (118.1)	37,940 (168.8)	33,260 (148.0)	38,080 (169.4)

*Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

* For Tie-Wire Wedge Anchor, TW-1400, use tension data from 1/4" diameter with 1-1/8" embedment.

*For continuous extreme low temperature applications, use stainless steel.

PERFORMANCE TABLE

Trubolt Wedge Anchors

Ultimate Tension and Shear Values (Lbs/kN) in Lightweight Concrete*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	LIGHTWEIGHT CONCRETE f'c = 3000 PSI (20.7 MPa)		LOWER FLUTE OF STEEL DECK WITH LIGHTWEIGHT CONCRETE FILL f'c = 3000 PSI (20.7 MPa)	
				TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	25 (33.9)	1-1/2 (38.1)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	1,175 (5.2)	1,480 (6.6)	1,900 (8.5)	3,160 (14.1)
		3 (76.2)		2,825 (12.6)	2,440 (10.9)	2,840 (12.6)	4,000 (17.8)
1/2 (12.7)	55 (74.6)	2-1/4 (57.2)		2,925 (13.0)	2,855 (12.7)	3,400 (15.1)	5,380 (23.9)
		3 (76.2)		3,470 (15.4)	3,450 (15.3)	4,480 (19.9)	6,620 (29.4)
		4 (101.6)		4,290 (19.1)	3,450 (15.3)	4,800 (21.4)	6,440 (28.6)
5/8 (15.9)	90 (122.0)	3 (76.2)		4,375 (19.5)	4,360 (19.4)	4,720 (21.0)	5,500 (24.5)
		5 (127.0)		6,350 (28.2)	6,335 (28.2)	6,580 (29.3)	9,140 (40.7)
3/4 (19.1)	110 (149.2)	3-1/4 (82.6)		5,390 (24.0)	7,150 (31.8)	5,840 (26.0)	8,880 (39.5)
		5-1/4 (133.4)		7,295 (32.5)	10,750 (47.8)	7,040 (31.3)	N/A

*Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

PERFORMANCE TABLE

Trubolt Wedge Anchors — Recommended Edge and Spacing Distance Requirements for Shear Loads*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. EDGE DISTANCE AT WHICH THE LOAD FACTOR APPLIED = .60 In. (mm)	MIN. EDGE DISTANCE AT WHICH THE LOAD FACTOR APPLIED = .20 In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING BETWEEN ANCHORS In. (mm) LOAD FACTOR APPLIED = .40
1/4 (6.4)	1-1/8 (28.6) 1-15/16 (49.2)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	2 (50.8) 1-15/16 (49.2)	1-5/16 (33.3) 1 (25.4)	N/A N/A	3-15/16 (100.0) 3-7/8 (98.4)	2 (50.8) 1-15/16 (49.2)
3/8 (9.5)	1-1/2 (38.1) 3 (76.2)		2-5/8 (66.7) 3-3/4 (95.3)	1-3/4 (44.5) 3 (76.2)	N/A 1-1/2 (38.1)	5-1/4 (133.4) 6 (152.4)	2-5/8 (66.7) 3 (76.2)
1/2 (12.7)	2-1/4 (57.2) 4-1/8 (104.8)		3-15/16 (100.0) 5-3/16 (131.8)	2-9/16 (65.1) 3-1/8 (79.4)	N/A 1-9/16 (39.7)	7-7/8 (200.0) 6-3/16 (157.2)	3-15/16 (100.0) 3-1/8 (79.4)
5/8 (15.9)	2-3/4 (69.9) 5-1/8 (130.2)		4-13/16 (122.2) 6-7/16 (163.5)	3-1/8 (79.4) 3-7/8 (98.4)	N/A 1-15/16 (49.2)	9-5/8 (244.5) 7-11/16 (195.3)	4-13/16 (122.2) 3-7/8 (98.4)
3/4 (19.1)	3-1/4 (82.6) 6-5/8 (168.3)		5-11/16 (144.5) 6-5/16 (160.3)	3-3/4 (95.3) 5 (127.0)	N/A 2-1/2 (63.5)	11-3/8 (288.9) 9-15/16 (252.4)	5-11/16 (144.5) 5 (127.0)
7/8 (22.2)	3-3/4 (95.3) 6-1/4 (158.8)		6-9/16 (166.7) 8-1/2 (215.9)	4-5/16 (109.5) 6-1/4 (158.8)	N/A 3-1/8 (79.4)	13-1/8 (333.4) 12-1/2 (317.5)	6-9/16 (166.7) 6-1/4 (158.8)
1 (25.4)	4-1/4 (108.0) 7-3/8 (187.3)		7-7/8 (200.0) 10-1/16 (255.6)	5-1/8 (130.2) 7-3/8 (187.3)	N/A 3-11/16 (93.7)	15-3/4 (400.1) 14-3/4 (374.7)	7-7/8 (200.0) 7-3/8 (187.3)

*Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

PERFORMANCE TABLE

Trubolt Wedge Anchors — Recommended Edge and Spacing Distance Requirements for Tension Loads*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE EDGE DISTANCE AT WHICH THE LOAD FACTOR APPLIED = .65 In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING AT WHICH THE LOAD FACTOR APPLIED = .70 In. (mm)
1/4 (6.4)	1-1/8 (28.6) 1-15/16 (49.2) 2-1/8 (54.0)	WS-Carbon or WS-G Hot-Dipped Galvanized or WW-304 S.S. or SWW-316 S.S.	2 (50.8) 1-15/16 (49.2) 1-5/8 (41.3)	1 (25.4) 1 (25.4) 13/16 (20.6)	3-15/16 (100.0) 3-7/8 (98.4) 3-3/16 (81.0)	2 (50.8) 1-15/16 (49.2) 1-5/8 (41.3)
3/8 (9.5)	1-1/2 (38.1) 3 (76.2) 4 (101.6)		2-5/8 (66.7) 3 (76.2) 3 (76.2)	1-5/16 (33.3) 1-1/2 (38.1) 1-1/2 (38.1)	5-1/4 (133.4) 6 (152.4) 6 (152.4)	2-5/8 (66.7) 3 (76.2) 3 (76.2)
1/2 (12.7)	2-1/4 (57.2) 4-1/8 (104.8) 6 (152.4)		3-15/16 (100.0) 3-1/8 (79.4) 4-1/2 (114.3)	2 (50.8) 1-9/16 (39.7) 2-1/4 (57.2)	7-7/8 (200.0) 6-3/16 (157.2) 9 (228.6)	3-15/16 (100.0) 3-1/8 (79.4) 4-1/2 (114.3)
5/8 (15.9)	2-3/4 (69.9) 5-1/8 (130.2) 7-1/2 (190.5)		4-13/16 (122.2) 3-7/8 (98.4) 5-5/8 (142.9)	2-7/16 (61.9) 1-15/16 (49.2) 2-13/16 (71.4)	9-5/8 (244.5) 7-1/16 (195.3) 11-1/4 (285.8)	4-13/16 (122.2) 3-7/8 (98.4) 5-5/8 (142.9)
3/4 (19.1)	3-1/4 (82.6) 6-5/8 (168.3) 10 (254.0)		5-11/16 (144.5) 5 (127.0) 7-1/2 (190.5)	2-7/8 (73.0) 2-1/2 (63.5) 3-3/4 (95.3)	11-3/8 (288.9) 9-15/16 (252.4) 15 (381.0)	5-11/16 (144.5) 5 (127.0) 7-1/2 (190.5)
7/8 (22.2)	3-3/4 (95.3) 6-1/4 (158.8) 8 (203.2)		6-9/16 (166.7) 6-1/4 (158.8) 6 (152.4)	3-5/16 (84.1) 3-1/8 (79.4) 3 (76.2)	13-1/8 (333.4) 12-1/2 (317.5) 12 (304.8)	6-9/16 (166.7) 6-1/4 (158.8) 6 (152.4)
1 (25.4)	4-1/2 (114.3) 7-3/8 (187.3) 9-1/2 (241.3)		7-7/8 (200.0) 7-3/8 (187.3) 7-1/8 (181.0)	3-15/16 (100.0) 3-11/16 (93.7) 3-9/16 (90.5)	15-3/4 (400.1) 14-3/4 (374.7) 14-1/4 (362.0)	7-7/8 (200.0) 7-3/8 (187.3) 7-1/8 (181.0)

*Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

Combined Tension and Shear Loading—for Trubolt Anchors

Allowable loads for anchors subjected to combined shear and tension forces are determined by the following equation:

$$(Ps/Pt)^{5/3} + (Vs/Vt)^{5/3} \leq 1$$

Ps = Applied tension load Vs = Applied shear load Pt = Allowable tension load Vt = Allowable shear load

Trubolt Strength Design Performance values in accordance to 2006 IBC

ITW RED HEAD TRUBOLT WEDGE ANCHOR

DESIGN INFORMATION TESTED TO ICC-ES AC193 AND ACI 355.2, IN ACCORDANCE WITH 2006 IBC

Trubolt® Wedge Anchors

TRUBOLT WEDGE ANCHOR DESIGN INFORMATION[1,2,3]

DESIGN INFORMATION	Symbol	Units	Nominal Anchor Diameter									
			1/4		3/8		1/2		5/8		3/4	
Anchor O.D.	d_o	in	0.250		0.375		0.500		0.625		0.750	
Effective embedment	h_{ef}	in	1-1/2	2	1-3/4	2-5/8	1-7/8	3-3/8	2-1/2	4	3-1/2	4-3/4
Minimum member thickness	h_{min}	in	4	4	4	5	5	6	5	8	6	8
Critical edge distance	c_{ac}	in	2-5/8	3	2-5/8	5-1/4	3-3/4	6-3/4	5	8	7	9
Minimum edge distance	c_{min}	in	1-3/4	1-1/2	2-1/4	2	3-3/4	3-3/4	4-1/4	3-1/4	3-3/4	3-1/2
Minimum anchor spacing	s_{min}	in	1-3/4	1-1/2	2-1/4	2	3-3/4	3-3/4	4-1/4	3-1/4	3-3/4	3-1/2
Min. Specified Yield Strength	f_y	lb/in^2	55,000									
Min. Specified Ultimate Strength	f_{uta}	lb/in^2	75,000									
Effective tensile stress area	A_{se}	in^2	0.032		0.078		0.142		0.226		0.334	
Steel strength in tension	N_s	lb	2,385		5,815		10,645		16,950		25,050	
Steel strength in shear	V_s	lb	1,430		2,975	3,490	4,450	6,385	6,045	10,170	10,990	15,030
Pullout strength, uncracked concrete	$N_{p,uncr}$	lb	1,392	1,706	2,198	3,469	2,400	4,168	4,155	6,638	8,031	10,561
Anchor Category (All anchors are ductile)			1									
Effectiveness factor k_{uncr} uncracked concrete			24									
Axial stiffness in service load range	β	lb/in	14,651	9,385	17,515	26,424	32,483	26,136	42,899	21,749	43,576	28,697
Coefficient for variation for axial stiffness in service load range			34	47	28	45	17	33	55	22	63	28
Strength reduction factor ϕ for tension, steel failure modes			0.75									
Strength reduction factor ϕ for shear, steel failure modes			0.65									
Strength reduction factor ϕ for tension, concrete failure modes, Condition B			0.65									
Strength reduction factor ϕ for shear, concrete failure modes, Condition B			0.70									

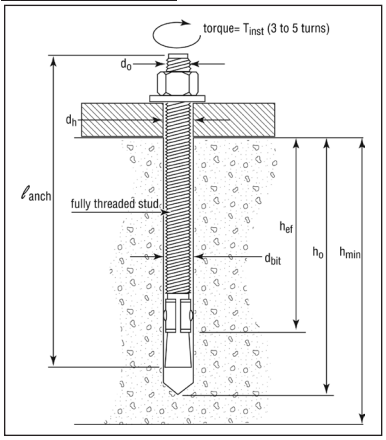
[1] Trubolt+ Anchor Design Strengths must be determined in accordance with ACI 318-05 Appendix D and this table

[2] The Trubolt+ Wedge Anchor is a ductile steel element as defined by ACI 318 D.1

[3] 1/4", 3/8", & 1/2" diameter data is listed in ICC-ES ESR-2251.

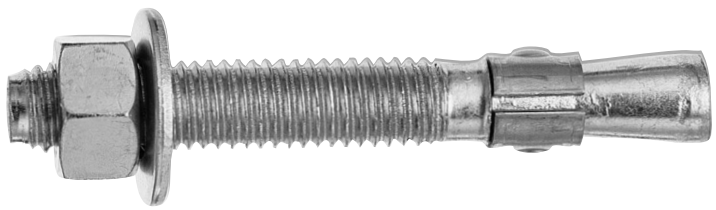
Trubolt® Wedge Anchors

TRUBOLT WEDGE ANCHOR (INSTALLED)



TRUBOLT WEDGE INSTALLATION INFORMATION

	Symbol	Units	Nominal Anchor Diameter (in.)									
			1/4		3/8		1/2		5/8		3/4	
Anchor outer diameter	d_o	in	0.25		0.375		0.5		0.625		0.750	
Nominal carbide bit diameter	d_{bit}	in	1/4		3/8		1/2		5/8		3/4	
Effective embedment depth	h_{ef}	in	1-1/2	2	1-3/4	2-5/8	1-7/8	3-3/8	2-1/2	4	3-1/2	4-3/4
Min hole depth	h_o	in	2	2-1/2	2-1/2	3-3/8	2-3/4	4-1/4	3-3/4	5-1/4	4-3/4	6
Min slab thickness	h_{min}	in	4		4	5	5	6	5	8	6	8
Installation torque	T_{inst}	ft-lb	4		25		55		90		110	
Min hole diameter in fixture	d_h	in	5/16		7/16		9/16		11/16		13/16	



Trubolt Strength Design Performance values in accordance to 2006 IBC

Trubolt®
Wedge Anchors

TRUBOLT WEDGE PULLOUT STRENGTH ($N_{p, unc}$) (POUNDS) [1]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Concrete Compressive Strength			
		f'c = 2,500 psi	f'c = 3,000 psi	f'c = 4,000 psi	f'c = 6,500 psi
1/4	1-1/2	1,392	1,525	1,610	1,822
	2	1,706	1,869	1,947	2,151
3/8	1-3/4	2,198	2,408	2,621	3,153
	2-5/8	3,469	3,800	3,936	4,275
1/2	1-7/8	2,400	2,629	3,172	4,520
	3-3/8	4,168	4,520	4,520	4,520
5/8	2-1/2	4,155	4,155	4,376	5,578
	4	6,638	6,900	7,968	10,157
3/4	3-1/2	8,031	8,322	9,610	12,251
	4-3/4	10,561	10,561	10,561	12,251

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
1 Values are for single anchors with no edge distance or spacing reduction.

TRUBOLT WEDGE ANCHOR ALLOWABLE STATIC TENSION (ASD), NORMAL-WEIGHT UNCRACKED CONCRETE [1-6]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Concrete Compressive Strength			
		f'c = 2,500 psi	f'c = 3,000 psi	f'c = 4,000 psi	f'c = 6,500 psi
1/4	1-1/2	611	670	707	800
	2	749	821	855	945
3/8	1-3/4	965	1,058	1,151	1,385
	2-5/8	1,524	1,669	1,729	1,878
1/2	1-7/8	1,054	1,155	1,393	1,985
	3-3/8	1,831	1,985	1,985	1,985
5/8	2-1/2	1,825	1,825	1,922	2,450
	4	2,915	3,030	3,499	4,461
3/4	3-1/2	3,527	3,655	4,221	5,381
	4-3/4	4,638	4,638	4,638	5,381

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
Design Assumptions:
1 Single anchor with static tension load only.
2 Concrete determined to remain uncracked for the life of the anchorage.
3 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
4 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
5 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
6 Values do not include edge distance or spacing reductions.

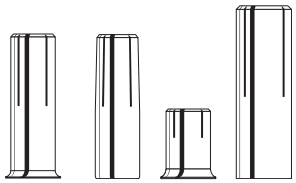
2006 IBC Compliant

TRUBOLT WEDGE ANCHOR ALLOWABLE STATIC SHEAR (ASD), STEEL (POUNDS)[1-5]

Nominal Anchor Diameter (in.)	Effective Embedment Depth (in.)	Allowable Steel Capacity, Static Shear
1/4	1-1/2	628
	2	
3/8	1-3/4	1,307
	2-5/8	1,533
1/2	1-7/8	1,954
	3-3/8	2,804
5/8	2-1/2	2,655
	4	4,467
3/4	3-1/2	4,827
	4-3/4	6,601

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 0.006895 Mpa
Design Assumptions:
1 Single anchor with static shear load only.
3 Load combinations from 2006 IBC, Sections 1605.2.1 and 1605.3.1 (no seismic loading).
3 Thirty percent dead load and 70 percent live load, controlling load combination 1.2D + 1.6L
4 Calculation of weighted average: 1.2D + 1.6L = 1.2 (0.3) + 1.6 (0.7) = 1.48
5 Values do not include edge distance or spacing reductions.

Multi-Set II®



SPECIFIED FOR ANCHORAGE INTO CONCRETE

Drop-In, shell-type anchors feature an internally threaded, all-steel shell with expansion cone insert and flush embedment lip. "Anchors are manufactured from zinc-plated carbon steel, 18-8 stainless steel and 316 stainless steel.

Anchors should be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994 specifications.

Anchors should be tested to ASTM E488 criteria and listed by ICC (formerly ICBO). Anchors should also be listed by the following agencies as required by the local building code: UL, FM, City of Los Angeles, California State Fire Marshal and Cal Trans.

APPROVALS/LISTINGS

Meets or exceeds U.S. Government G.S.A. Specification A-A-55614 Type 1 (Formerly GSA: FF-S-325 Group VIII)

Underwriters Laboratories

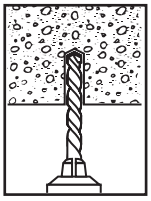
Factory Mutual

California State Fire Marshal

Caltrans

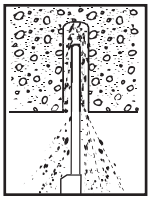
For the most current approvals/listings visit: www.itw-redhead.com

INSTALLATION STEPS



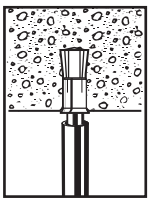
To set anchor flush with surface:

1. Drill hole to required embedment (see Table on page 73).



2. Clean hole with pressurized air.

3. Drive anchor flush with surface of concrete.



4. Expand anchor with setting tool provided (see chart). Anchor is properly expanded when shoulder of setting tool is flush with top of anchor.

To set anchor below surface:

Drill hole deeper than anchor length. Thread bolt into anchor. Hammer anchor into hole until bolt head is at desired depth. Remove bolt and set anchor with setting tool.

PERFORMANCE TABLE

Multi-Set II Drop-In Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Concrete*

BOLT DIA. In. (mm)	ANCHOR DIA. In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	TENSION Lbs. (kN)			SHEAR Lbs. (kN)
				f'c = 2000 PSI (13.8 MPa)	f'c = 4000 PSI (27.6 MPa)	f'c = 6000 PSI (41.4 MPa)	f'c ≥2000 PSI (13.8 MPa)
1/4 (6.4)	3/8 (9.5)	1 (25.4)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	1,680 (7.5)	2,360 (10.5)	2,980 (13.3)	1,080 (4.8)
3/8 (9.5)	1/2 (12.7)	1-5/8 (41.3)		2,980 (13.3)	3,800 (16.9)	6,240 (27.8)	3,160 (14.1)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		3,300 (14.7)	5,840 (26.0)	8,300 (36.9)	4,580 (20.4)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		5,500 (24.5)	8,640 (38.4)	11,020 (49.0)	7,440 (33.1)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		8,280 (36.8)	9,480 (42.2)	12,260 (54.5)	10,480 (46.6)

*Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

*For continuous extreme low temperature applications, use stainless steel.

Combined Tension and Shear Loading—for Multi-Set Anchors

Allowable loads for anchors subjected to combined shear and tension forces are determined by the following equation:

$$(Ps/Pt)^{5/3} + (Vs/Vt)^{5/3} \leq 1$$

Ps = Applied tension load **Vs = Applied shear load** **Pt = Allowable tension load** **Vt = Allowable shear load**

PERFORMANCE TABLES

Multi-Set II Drop-In Anchors — Ultimate Tension and Shear Values (Lbs/kN) in Lightweight Concrete*

BOLT DIA. In. (mm)	ANCHOR DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	LIGHTWEIGHT CONCRETE f'c = 3000 PSI (20.7 MPa)		LOWER FLUTE OF STEEL DECK WITH LIGHTWEIGHT CONCRETE FILL f'c = 3000 PSI (20.7 MPa)	
				TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1/2 (12.7)	1-5/8 (39.7)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	2,035 (9.1)	1,895 (8.4)	3,340 (14.9)	4,420 (19.6)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		2,740 (12.2)	2,750 (12.2)	3,200 (14.2)	4,940 (22.0)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		4,240 (18.9)	4,465 (19.9)	5,960 (26.5)	5,840 (26.0)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		5,330 (23.7)	6,290 (28.0)	8,180 (36.4)	9,120 (40.6)

*Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Multi-Set II Drop-In Anchors — Recommended Edge and Spacing Distance Requirements*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. EDGE DISTANCE AT WHICH LOAD FACTOR APPLIED =.80 FOR TENSION =.70 FOR SHEAR In. (mm)	SPACING REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	MIN. ALLOWABLE SPACING BETWEEN ANCHORS LOAD FACTOR APPLIED =.80 FOR TENSION =.55 FOR SHEAR In. (mm)
1/4 (6.4)	3/8 (9.5)	1 (25.4)	RM, RL or CL-Carbon or SRM-18-8 S.S. or SSRM-316 S.S.	1-3/4 (44.5)	7/8 (22.2)	3-1/2 (88.9)	1-3/4 (44.5)
3/8 (9.5)	1/2 (12.7)	1-5/8 (41.3)		2-7/8 (73.0)	1-7/16 (36.5)	5-11/16 (144.5)	2-7/8 (73.0)
1/2 (12.7)	5/8 (15.9)	2 (50.8)		3-1/2 (88.9)	1-3/4 (44.5)	7 (177.8)	3-1/2 (88.9)
5/8 (15.9)	7/8 (22.2)	2-1/2 (63.5)		4-3/8 (111.1)	2-3/16 (55.6)	8-3/4 (222.3)	4-3/8 (111.1)
3/4 (19.1)	1 (25.4)	3-3/16 (81.0)		5-5/8 (142.9)	2-13/16 (71.4)	11-3/16 (284.2)	5-5/8 (142.9)

*Spacing and edge distances shall be divided by 0.75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

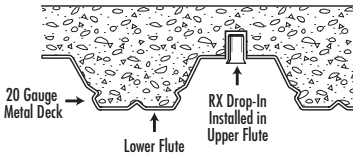
Multi-Set II Drop-In Anchors — Ultimate Tension and Shear Values (Lbs/kN) for RX-series (3/4" and 1" Embedment)*

BOLT DIA. In. (mm)	DRILL BIT SIZE In. (mm)	EMBEDMENT In. (mm)	2500 PSI (17.2 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE		HOLLOW CORE	
			TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/8 (9.5)	1/2 (12.7)	3/4 (19.1)	1,571 (7.0)	2,295 (10.2)	1,987 (8.8)	2,903 (12.9)	1,908 (8.5)	2,401 (10.7)
1/2 (12.7)	5/8 (15.9)	1 (25.4)	2,113 (9.4)	2,585 (11.5)	2,673 (11.9)	3,270 (14.5)	2,462 (11.0)	2,401 (10.7)

* The tabulated values are for RX anchors installed at a minimum of 12 diameters on center and minimum edge distance of 6 diameters for 100 percent anchor efficiency. Spacing and edge distance may be reduced to 6 diameters spacing and 3 diameter edge distance provided the values are reduced 50 percent. Linear Interpolation may be used for intermediate spacings and edge margins.

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

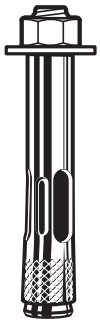
Multi-Set II Drop-In Anchors — Anchoring Overhead in 3000 PSI Lightweight Concrete On Metal Deck



ANCHOR In. (mm)	DRILL HOLE DIAMETER	EMBEDMENT In. (mm)	3000PSI (20.7 MPa) CONCRETE		
			ULTIMATE TENSION LOAD Lbs. (kN)		ALLOWABLE WORKING LOAD Lbs. (kN)
RX-38 Drop-In	1/2 (12.7)	3/4 (19.1)	Upper Flute	1,410 (6.3)	353 (1.6)
			Lower Flute	1,206 (5.4)	301 (1.3)

*Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values.

Dynabolt Sleeve



SPECIFIED FOR ANCHORAGE INTO CONCRETE, GROUT-FILLED CONCRETE BLOCK, HOLLOW CONCRETE BLOCK AND BRICK

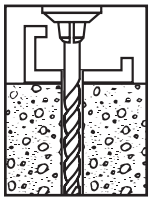
Sleeve type anchors feature a split expansion sleeve over a threaded stud bolt body and integral expander, nut and washer.

Anchors are made of Zinc-Plated Carbon Steel, or Type 304 Stainless Steel.

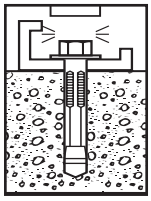
Anchors should be installed with carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994.

Anchors are tested to ASTM E488 criteria.

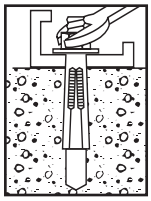
INSTALLATION STEPS



1. Use a bit with a diameter equal to the anchor. See selection chart to determine proper size bit for anchor used. Drill hole to any depth exceeding minimum embedment. Clean hole.



2. Insert assembled anchor into hole, so that washer or head is flush with materials to be fastened.

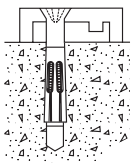


3. Expand anchor by tightening nut or head 2 to 3 turns.

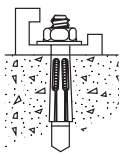
Available Head Styles

Full range of head style, corrosion protection, and sizes makes the Dynabolt Sleeve the right product for almost any application.

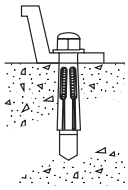
Phillips Flat Head **(FS)**



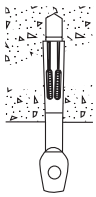
Hex Nut **(HN)**



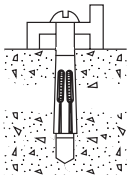
Acorn Nut **(AN)**



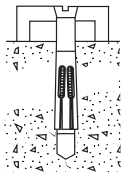
Tie Wire **(TW)**



Round Head **(RS)**



Threshold Flat Head **(TH)**



APPROVALS/LISTINGS

Meets or exceeds U.S. Government G.S.A. Specification A-A-1922A
(Formerly GSA: FF-S-325 Group II, Type 3, Class 3)

Factory Mutual

California State Fire Marshal

PERFORMANCE TABLE

Dynabolt Sleeve Anchors — Ultimate Tension and Shear Values in Concrete (Lbs/kN)*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	BOLT DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE (STEEL)	f'c = 2000 PSI (13.8 MPa)		f'c = 3000 PSI (20.7 MPa)		f'c = 4000 PSI (27.6 MPa)	
					TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	3.5 (4.7)	3/16 (4.8)	1-1/8 (28.6)	Carbon or Stainless	1,200 (5.3)	1,215 (5.4)	1,325 (5.9)	1,215 (5.4)	1,450 (6.4)	1,215 (5.4)
5/16 (7.9)	8 (10.8)	1/4 (6.4)	1-1/4 (31.8)		1,400 (6.2)	2,040 (9.1)	1,920 (8.5)	2,220 (9.9)	2,600 (11.6)	2,400 (10.7)
3/8 (9.5)	14 (19.0)	5/16 (7.9)	1-1/2 (38.1)		1,620 (7.2)	2,560 (11.4)	2,240 (10.0)	2,800 (12.5)	3,100 (13.8)	3,040 (13.5)
1/2 (12.7)	20 (27.1)	3/8 (9.5)	1-7/8 (47.6)		2,220 (9.9)	4,000 (17.8)	3,140 (14.0)	4,500 (20.0)	4,400 (19.6)	5,000 (22.2)
5/8 (15.9)	48 (65.1)	1/2 (12.7)	2 (50.8)		3,080 (13.7)	6,440 (28.6)	4,400 (19.6)	7,240 (32.2)	6,120 (27.2)	8,080 (35.9)
3/4 (19.1)	90 (122.0)	5/8 (15.9)	2-1/4 (57.2)		4,200 (18.7)	10,200 (45.4)	6,060 (27.0)	11,600 (51.6)	8,900 (39.6)	13,100 (58.3)

*For continuous extreme low temperature applications, use stainless steel.

PERFORMANCE TABLES

Dynabolt Sleeve Anchors — Ultimate Tension and Shear Values in Lightweight Concrete (Lbs/kN)*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	BOLT DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE (STEEL)	f'c = 4000 PSI (27.6 MPa)		f'c = 6000 PSI (41.4 MPa)	
					TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	3.5 (4.7)	3/16 (4.8)	1-1/8 (28.6)	Carbon or Stainless	870 (3.9)	730 (3.2)	1,066 (4.7)	894 (4.0)
5/16 (7.9)	8 (10.8)	1/4 (6.4)	1-1/4 (31.8)		1,260 (5.6)	1,680 (7.5)	1,440 (6.4)	2,220 (9.9)
3/8 (9.5)	14 (19.0)	5/16 (7.9)	1-1/2 (38.1)		1,620 (7.2)	2,300 (10.2)	2,240 (10.0)	2,800 (12.5)
1/2 (12.7)	25 (33.9)	3/8 (9.5)	1-7/8 (47.6)		2,600 (11.6)	3,920 (17.4)	3,160 (14.1)	4,840 (21.5)
5/8 (15.9)	48 (65.1)	1/2 (12.7)	2 (50.8)		3,240 (14.4)	5,600 (24.9)	4,300 (19.1)	7,840 (34.9)
3/4 (19.1)	90 (122.0)	5/8 (15.9)	2-1/4 (57.2)		3,640 (16.2)	8,640 (38.4)	5,800 (25.8)	12,480 (55.5)

*For continuous extreme low temperature applications, use stainless steel.

For AN-1405, Ultimate Pullout: 500 lbs. & Ultimate Shear: 1751 lbs. based on 4,000 psi.

Dynabolt Sleeve Anchors — Ultimate Tension and Shear Values in Concrete Masonry Units (Lbs/kN)*

ANCHOR DIA. In. (mm)	INSTALLATION TORQUE Ft. Lbs. (Nm)	BOLT DIA. In. (mm)	MINIMUM EMBEDMENT DEPTH In. (mm)	ANCHOR TYPE (STEEL)	LIGHTWEIGHT				MEDIUM WEIGHT			
					HOLLOW CORE		GROUT FILLED		HOLLOW CORE		GROUT FILLED	
					TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
1/4 (6.4)	3.5 (4.7)	3/16 (4.8)	1-1/8 (28.6)	Carbon	1,120 (5.0)	1,215 (5.4)	1,120 (5.0)	1,215 (5.4)	1,120 (5.0)	1,215 (5.4)	1,120 (5.0)	1,215 (5.4)
				Stainless	640 (2.8)	1,620 (7.2)	640 (2.8)	1,620 (7.2)	640 (2.8)	1,620 (7.2)	640 (2.8)	1,620 (7.2)
3/8 (9.5)	15 (20.3)	5/16 (7.9)	1-1/2 (38.1)	Carbon	1,360 (6.0)	2,560 (11.4)	1,360 (6.0)	2,560 (11.4)	1,360 (6.0)	2,560 (11.4)	1,360 (6.0)	2,560 (11.4)
				Stainless	1,160 (5.2)	2,560 (11.4)	1,160 (5.2)	2,560 (11.4)	1,160 (5.2)	2,560 (11.4)	1,160 (5.2)	2,560 (11.4)
1/2 (12.7)	25 (33.9)	3/8 (9.5)	1-7/8 (47.6)	Carbon	N/A	N/A	2,220 (9.9)	4,000 (17.8)	N/A	N/A	2,220 (9.9)	4,000 (17.8)
				Stainless	N/A	N/A	2,100 (9.3)	4,000 (17.8)	N/A	N/A	2,100 (9.3)	4,000 (17.8)
5/8 (15.9)	55 (74.6)	1/2 (12.7)	2 (50.8)	Carbon	N/A	N/A	3,080 (13.7)	6,440 (28.6)	N/A	N/A	3,080 (13.7)	6,440 (28.6)
				Stainless	N/A	N/A	3,080 (13.7)	6,440 (28.6)	N/A	N/A	2,820 (12.5)	6,440 (28.6)
3/4 (19.1)	90 (122.0)	5/8 (15.9)	2-1/2 (63.5)	Carbon	N/A	N/A	4,200 (18.7)	10,200 (45.4)	N/A	N/A	4,200 (18.7)	10,200 (45.4)

* Allowable values are based upon a 4 to 1 safety factor. Divide by 4 for allowable load values. **The tabulated values are for anchors installed in a minimum of 12 diameters on center and a minimum edge distance of 6 diameters for 100 percent anchor efficiency. Spacing and edge distance may be reduced to 6 diameter spacing and 3 diameter edge distance, provided the values are reduced 50 percent. Linear interpolation may be used for intermediate spacings and edge distances.**

Combined Tension and Shear Loading—for Dynabolt Anchors

Allowable loads for anchors subjected to combined shear and tension forces are determined by the following equation:

$$(Ps/Pt) + (Vs/Vt) \leq 1$$

Ps = Applied tension load Vs = Applied shear load Pt = Allowable tension load Vt = Allowable shear load

Tool/Fastener Compatibility Guide

Grip-Rite®, the leader in fasteners, is committed to making your collated fastener purchase simple and easy. Use this cross-reference guide to quickly identify which tools are compatible with each type of Grip-Rite collated fastener, and vice versa (which Grip-Rite collated fasteners will fit your tools).

*Model numbers change often as new or updated tools are introduced. Please use the icon system when possible or call 800 676-7777 for assistance.

FIND THE APPLICATION

FRAMING

FASTENER CATEGORIES AND TYPES OF COLLATION ARE CLEARLY DEFINED

GRIP-RITE COLLATED FASTENER AND TOOL PACKAGING FEATURE THE ICON MATCHING SYSTEM

21° ROUND HEAD NAIL

21° Plastic Strip Round Head Nails

Grip-Rite: GRTFR83

COMPATIBLE MAJOR TOOL BRANDS AND MODELS ARE LISTED WITH EACH TYPE OF GRIP-RITE COLLATED FASTENERS

GRIP-RITE COLLATED FASTENER PACKAGING CLEARLY SHOWCASE THE FASTENER ICON

ROOFING

RF ROOFING NAIL

15° COIL ROOFING NAILS

Grip-Rite: GRTCR175, GRTRN45
Bostitch: RN45, RN45B, RN46, RN46-1, BRN175A
DeWalt: DW45RN, DCN45RN
Duo-Fast: DRN-45, RN-175
Hitachi/Metabo HPT: NV45AB2, NV45A
Makita: AN451, AN453, AN454
Milwaukee: 7120-21, 7220-20, 7220-80
Max: CN445R, CN445R2, CN450R, CN445R3
Paslode: R-175C, 3175/44RCU
Porter-Cable: 134R, RN175, RN175A, RN175C
Ridgid: R175RNE
Senco: SNC40R, SCN200R, ROOFPRO 450, ROOFPRO 455XP

CP STAPLE CAP

LASER WELDED PLASTIC CAPS AND STAPLES

Grip-Rite: GRC58, GRC58A
Pneu Tools: RC-58, RC-58II
Senco: BC58

SIDING/FENCING

0° COIL SIDING NAIL

0° COIL SHEET NAILS

Grip-Rite: GRTCS250Z
Duo-Fast: DF225C, 502950
Pneu Tools: CN65Z

15° COIL SIDING NAIL

15° PLASTIC SHEET NAILS

Grip-Rite: GRTCS250
Bostitch: N63CP, N63CP-1, N66C, N66C-1
DeWalt: DW66C-1
Hitachi/Metabo HPT: NV65AH, NV75AG, NV50A1, NV65AH2, NV65AN
Makita: AN611
Max: CN565D, CN565S, CN890S
Senco: SCN49, SCN55S, SCN56

15° COIL NAIL

15° WIRE WELD NAILS

Grip-Rite: GRTCS250
Bostitch: N50C, N55C, N65CP, N65CP-2, N66C-1
DeWalt: DW66C-1
Hitachi/Metabo HPT: NV65AB, NV65AE, NV65AH, NV75AG, NV50A1, NV65AH2, NV65AN
Makita: AN611
Max: CN55, CN550S, CN565S, CN665, CN890II, CN665D, CN565S3
Senco: SCN45, SCN49, SCN55S, SCN56

The list of tools for each fastener is not exclusive.
Refer to tool manuals for fastener size compatibility.

Grip-Rite® RED SYSTEM™

FRAMING

15° WIRE COIL NAILS

Grip-Rite: GRTCN90
Bostitch: N80CB-1, BTF83C, N89C-1, N75C-1, N66C-1
DeWalt: DWF83C-1
Duo-Fast: CNW-75, DCN-325/85L
Hitachi/Metabo HPT: NV65AB, NV65AC, NV83A2, NV83A4, NV50A1, NV65AH2, NV65AN
Makita: AN-901, AN-621, AN902
Max: CN70, CN80, CN565, CN890S, CN890F2
Paslode: F275C, 4275/CN70, F325C
Porter-Cable: COIL350
Senco: SCN49, SCN60XP, SCN300

21° PLASTIC STRIP ROUND HEAD NAILS

Grip-Rite: GRTFR83, GRTFR83L, GRTRH350
Bostitch: F21PL, F21PL2, BTF21PL
DeWalt: DWF83PL, DCN21PLM
Duo-Fast: FDF350CN, CN-137, CN-350 CN-350B, SNP-83
Hitachi/Metabo HPT: NR83A2, NR90AE, NR90AEPR, NR83A3, NR83A3(S), NR83A5, NR83A5(S), NR90AES, NR90AES1, NR90A5
Husky: DPFR2190
Makita: AN922, AN923, AN8300, AN924
Max: GS683RH-EX, SN80, SN883RH2, SN890RH
Milwaukee: 274-22, 7200-20
Paslode: 5325/SRH, 5350/SRH-20, F350-21
Porter-Cable: FR350B
Ridgid: R350RHA, R350RHE, R350RHF
Senco: FRAMEPRO 502, FRAMEPRO 650, SN60, SN65, SN902XP, GT90FRH

28° PLASTIC STRIP CLIPPED HEAD NAILS

Duo-Fast: NSPM-325F

28° WIRE WELD CLIPPED HEAD & OFFSET ROUND HEAD NAILS

Grip-Rite: GRTFW83
Bostitch: GF28WW, 728WW, N80SB, LPF28WW6, BCF28WWM1/B, BTF83WW
Duo-Fast: CN-325B
Hitachi/Metabo HPT: NR90AF, NR90AFS, NR90AFS1
Max: SN883CH/28, SN890CH/28
Porter-Cable: FM350, FM350A

30° PAPER TAPE CLIPPED HEAD & OFFSET ROUND HEAD NAILS

Grip-Rite: GRTFC83, GRTCH350
Bostitch: F33PT, LP33PT, N79PT, N90PT
DeWalt: DCN692, D51822, D51823, DCN692M1, DCN692B
Hitachi/Metabo HPT: NR83AA, NR83AA2, NR83AA3, NR90AA, NR90AD, NR90GC, NR90ADS, NR90ADS1, NR83AA4, NR83AA5
Husky: DPFR3490
Makita: AN942, AN943
Milwaukee: 7110-20
Max: SN883CH/34, SN890CH/34, SNH890CH2/34
Paslode: 5300, 900420, IMPULSE 35, CF325XP, PF250S, PF350S, 513000, F350S POWER MASTER PLUS
Porter-Cable: FC350, FC350A, FC350B
Ridgid: R350CHA, R350CHE
Senco: FRAMEPRO 601/651, FRAMEPRO 701XP/751XP, SN901XP, SN951XP

JOIST HANGER

33° PAPER TAPE JOIST HANGER NAILS

Grip-Rite: GR150, GR250, GRSB150, GRSB250
Bostitch: MCN150, MCN250
DeWalt: DWMC150
Hitachi/Metabo HPT: NR65AK, NR65AK(S), NR38AKM
Max: SN438J
Paslode: 5250/65S PP, 5250S PP, F250S-PP, PF150S-PP
Pneu Tools: RN150, RN250, RNS150, RNS250
Senco: HN150, HN250, JoistPro 150/250

33° PLASTIC STRIP JOIST HANGER NAILS

Grip-Rite: GR150, GR250
Bostitch: MCN150, MCN250
Pneu Tools: RN150, RN250
Senco: HN150, HN250

The list of tools for each fastener is not exclusive.
Refer to tool manuals for fastener size compatibility.

Grip-Rite® RED SYSTEM™

FINISH

15 GAUGE "DA"-STYLE ANGLED FINISH NAILS

Grip-Rite: GRTAN250, GRTAN1565
Bostitch: BTFP72155, GFN1564, DA1564K
DeWalt: D51276K, DWFP72155
Duo-Fast: DAFN-6480
Hitachi/Metabo HPT: NT65AA, NT65GA, NT65MA4
Makita: AF631, AF632, AF633, AF635
Max: NF510/15-50, NF550/15-65, NF665A/15
Milwaukee: 7140-21
Porter-Cable: CDA250, DA250, DA250A, DAFN-6480
Ridgid: R250AFE, R250AF18
Ryobi: P330-P163
Senco: FINISHPRO 42XP, FINISHPRO 35, SFN1, SFN40, GT65DA, FIP35MG

15 GAUGE "FN"-STYLE ANGLED FINISH NAILS

Bostitch: BTFP721556, N62FNK-2, N62FN, N60FN
Max: NF665/15, NF510/15-50

16 GAUGE ANGLED FINISH NAILS

Hitachi/Metabo HPT: NT65GB
Paslode: IM250A, 902400
Senco: FUSION F-16A
Milwaukee: 2742-21CT

16 GAUGE STRAIGHT FINISH NAILS

Grip-Rite: GRTFN250
DeWalt: D51257K, DWFP71917, DCN660D1
Duo-Fast: SURE SHOT 764
Hitachi/Metabo HPT: NT65GS
Makita: AF601
Max: NF565/16
Milwaukee: 2741-21CT, 2741-20, 7145-21
Paslode: 902000, T250S-F16, 916000, 515500
Porter-Cable: FN250C
Ridgid: R250SFE, R250SFF
Ryobi: YN250FSD, P325
Senco: FUSION F-16S, FINISHPRO 32, FINISHPRO 16XP

18 GAUGE BRAD NAILS

Grip-Rite: GRTBN125, GRTBN200, GRTBN200N
Bostitch: BT1855, SB-1850BN, BTFP12233
DeWalt: DWFP12231, DWFP12233, DCN680B, D51236, D51238
Duo-Fast: SURE SHOT 4450, SURE SHOT 4450ST
Grex: 185-GB, 1832, 1850, 1850GB
Hitachi/Metabo HPT: NT50AE, NT50AE2, NT32AE
Husky: DP2118G
Max: NF255FA/18, NF255SF2/18
Milwaukee: 2740-20, 7150-21, 2746-20, 2740-80
Paslode: T200-F18, 91000
Porter-Cable: BN200C, PCC790B
Ridgid: R213BNE, R692BBN, R09890B, R09890K, R231BNF
Ryobi: P320, P325, P330, P1855, YG200BN2

23 GAUGE HEADLESS MICROPINS

Grip-Rite: GRTPIN23, GRTPIN23A
Bostitch: HP118K
Duo-Fast: SURE SHOT 2336
Grex: P650, P630, P635
Hitachi/Metabo HPT: NP35A
Max: NF2235A, NF235A-25
Porter-Cable: PIN100
Ridgid: R138HPA
Senco: FINISHPRO 10, FINISHPRO 11, SHP10

FLOORING

15-1/2 GAUGE FLOORING STAPLES

1/2" Crown

Grip-Rite: GR200FS
Bostitch: MIIIFS
Duo-Fast: FLOOR MASTER 200-S

"L" HARDWOOD FLOORING CLEATS

Grip-Rite: GR200LCN
Bostitch: MFN200, MFN201
Porter-Cable: FCN200
Senco: SHF10, SHF15, SHF50

CONCRETE

CONCRETE T-NAILS

Bostitch: MIII812CNCT
Porta-Nails: 460A
Spotnails: MT9764, XT8664
Grex: 2564
Senco: GT40CP

The list of tools for each fastener is not exclusive.
Refer to tool manuals for fastener size compatibility.

Grip-Rite® RED SYSTEM™

STAPLES

18GA NARROW CROWN STAPLE — "L"-STYLE NARROW CROWN STAPLES

Grip-Rite: GRTSN100, GRTSN150
Duo-Fast: KN01848, KN1848A, BN-1832, KG-1836
Hitachi/Metabo HPT: N3804, N3804A, N3804AB3
Makita: AF638
Max: TA238/18-6
Milwaukee: 7155-21
Porter-Cable: NS100, NS100A, NS150, NS150B
Ridgid: R150FSA, R150FSE
Ryobi: P1850, P360
Senco: LN4450, KMN4450, SKS-L, FINISHPRO 2N1, SLS15, SLS18

18GA NARROW CROWN STAPLE — "SX"-STYLE NARROW CROWN STAPLES

7/32" Crown

Bostitch: SB150SX, S32SX, T28-5, SX150, SB2N1

16GA MEDIUM CROWN STAPLE DUO-FAST — "76"-STYLE MEDIUM CROWN STAPLES

7/16" Crown

Bostitch: S4
Duo-Fast: MS-7664E, DS-7656P, SM-7648, SM-7664
Makita: AT1150A
Max: TA551/76

16GA MEDIUM CROWN STAPLE — "N"-STYLE MEDIUM CROWN STAPLES

7/16" Crown

Grip-Rite: GRTSM200, GRTSM2016C
DeWalt: DWFP1838
Hitachi/Metabo HPT: N5008AA, N5008AB, N5008AC, N5008AC2
Makita: AT1150A
Max: TA551/16-11, TA551A/16-11
Porter-Cable: MS200
Senco: SKS N12-N17, SNS40, SNS44XP, SNS200XP, SNS50XP, M1, M2

16GA MEDIUM CROWN STAPLE — "GS"-STYLE MEDIUM CROWN STAPLES

1/2" Crown

Hitachi/Metabo HPT: N5010A
Paslode: IM200-16S, MA-S16L, 3150-S16, S200-S16, SCS200

16GA MEDIUM CROWN STAPLE — "BCS"-STYLE MEDIUM CROWN STAPLES

1/2" Crown

Bostitch: 538S4, 438S4, 650S4-1, 750S4, 850S4

16GA WIDE CROWN STAPLE — "BCS"-STYLE WIDE CROWN STAPLES

1" Crown

Grip-Rite: GRTS2550
Bostitch: 5450S2, 438S2, 450S2R, 438S2R
DeWalt: 451S2

16GA WIDE CROWN STAPLE — "GSW"-STYLE WIDE CROWN STAPLES

15/16" Crown

Grip-Rite: GRTS1516, GRTS2350
Hitachi/Metabo HPT: N5021A
Paslode: 3150-W16, 3200-W16, S200-W16, MU-112-W16R, S150-W16R

16GA WIDE CROWN STAPLE — "P"-STYLE WIDE CROWN STAPLES

1" Crown

Grip-Rite: GRTS1200, GRTS2650
Duo-Fast: KW-1748, KWR-1748, RNS-1748, RS-1748, SW-1748
Hitachi/Metabo HPT: N3824A, N5024A, N5024A2
Senco: MW, MWXP, PW, PW200, SPS, WC150XP, WC200XP

TACKER STAPLES

A11 TACKER — "A11" STYLE TACKER STAPLES

3/8" Crown

Grip-Rite: GRR11
Arrow: T-50, HT-50, HT-55
Bostitch: PHT150C, TR100, TR200, TRE500
Duo-Fast: SLAPSHOT
Rapid: A11, R11
Senco: PC0705, 85000, 85060

A11 TACKER — "54"-STYLE TACKER STAPLES

3/8" Crown

Grip-Rite: GRR11C
Rapid: 54

50 TACKER — "50"-STYLE TACKER STAPLES

1/2" Crown

Grip-Rite: GR50BL
Duo-Fast: HT-550, SURESHOT 5020

A19 TACKER — "A19"-STYLE TACKER STAPLES

3/8" Crown

Grip-Rite: GRR19
Rapid: A19, R19

STCR TACKER — "STCR"-STYLE TACKER STAPLES

7/16" Crown

Grip-Rite: GRSTCR5019
Bostitch: H30-8, PC2K, PC4000, T6-8
Rapid: 31

SHCR TACKER — "SHCR"-STYLE TACKER STAPLES

7/16" Crown

Bostitch: H2B

Grip Rite®
800-676-7777
www.grip-rite.com

WE BUILD AMERICA™

Ramset DRIVING JOBSITE SPEED

Ramset fasteners may be specified by their type or catalog number to satisfy fastening requirements.

PIN SPECIFICATIONS

- Made from AISI 1060-1065 steel. Austempered to a core hardness of 52-56 Rc
- Typical tensile strength: 270,000 psi
- Typical shear strength: 162,000 psi
- STANDARD FINISHES
  - Proprietary black
  - Mechanical zinc plate to a minimum thickness of .0002 meets requirements of ASTM B695
  - Electroplated zinc with yellow chromate

APPROVALS/LISTINGS

- **ICC Evaluation Service, Inc.**

  #ER-1147 Sill Plate
  #ESR-1799 Powder Pins & Clips
  #ER-3618 Ladd
  #ER-5001 TrakFast Pins
  #ESR-1955 T3 Fasteners

- **City of Los Angeles**

  #RR-22668 Powder pins
  #RR-24279 Ladd
  #RR-25264 TrakFast pins

COLLATED GAS FASTENERS IN CONCRETE (TRAKFAST, T2 AND T3)

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH **ALLOWABLE LOAD** – *Ultimate Load*											
			2000 PSI				3000 PSI				4000 PSI			
			TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)	
FPP - Straight Shank	0.109	5/8	**60**	*434*	**55**	*546*	**55**	*453*	**75**	*615*	**55**	*472*	**95**	*685*
		3/4	**60**	*595*	**80**	*650*	**55**	*583*	**95**	*699*	**55**	*571*	**115**	*749*
FPP - Step Shank	0.104/0.118	3/4	-----	-----	-----	-----	-----	-----	-----	-----	**51**	*256*	**83**	*418*
T3 Straight Shank	0.125	5/8	**83**	*414*	**109**	*611*	-----	-----	-----	-----	**78**	*426*	**80**	*574*
		3/4	**107**	*541*	**156**	*855*	-----	-----	-----	-----	**104**	*593*	**195**	*977*

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH **ALLOWABLE LOAD** – *Ultimate Load*											
			3000 PSI LIGHT WEIGHT CONCRETE				3000 PSI LIGHT WEIGHT CONCRETE WITH METAL DECK				HOLLOW CONCRETE MASONRY UNITS (CMU) ANY LOCATION			
			TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)	
FPP - Straight Shank	0.109	5/8	**35**	*234*	**55**	*403*	**30**	*239*	**205**	*1025*	**35**	*347*	**50**	*435*
		3/4	**80**	*630*	**115**	*756*	**40**	*330*	**100**	*1284*	-----	-----	-----	-----
FPP - Step Shank	0.104/0.118	3/4	-----	-----	-----	-----	-----	-----	-----	-----	**36**	*184*	**34**	*264*
T3 Straight Shank	0.125	5/8	**84**	*418*	**108**	*540*	**72**	*361*	**242**	*1210*	**20**[9]	*243*	**34**	*264*
		3/4	**108**	*540*	**173**	*864*	**93**	*470*	**288**	*1442*	-----	-----	-----	-----

Note 1: ALLOWABLE loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font. **Note 2:** Testing conducted in accordance with ICC AC70 & ASTM E1190. **Note 3:** Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5. **Note 4:** Values shown in concrete are for the fastener only. Connected members must be investigated separately. **Note 5:** Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor. **Note 6:** Job site testing may be required to determine actual job site values. **Note 7:** Minimum edge distance in concrete is 3 inches unless otherwise approved. **Note 8:** For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa. **Note 9:** T3 straight shank allowable tension value in face shell of hollow CMU is 133 lbs.
Tables converted to metric are available on our website.

Performance Tables

FASTENERS IN CONCRETE

	FASTENER PART NUMBER	SHANK DIA. (INCH)	MINIMUM PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH **ALLOWABLE LOAD** – *Ultimate Load*						HOLLOW BLOCK Grade N, Type 1	
				4000 PSI		6000 PSI		3000 PSI Lightweight LOWER FLUTE		FACE SHELL Min 1-1/4" face thickness	
				TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)
GAS ASSEMBLIES	MP034TH*, M034*	0.125	5/8	**78** *426*	**80** *574*	**62** *308*	---- ----	**72** *361*	**242***1210*	**133** *691*	---- ----
	M100*, BR2*		3/4	**104** *593*	**195** *977*	**132** *658*	**206** *1057*	**93** *470*	**288** *1442*	**84** *444*	**87** *446*
	14STUD	0.125	5/8	**91** *454*	---- ----	**57** *373*	---- ----	---- ----	---- ----	---- ----	---- ----
	M034BB	0.104/ .118	3/4	**51** *256*	**83** *418*	---- ----	---- ----	---- ----	---- ----	**36** *184*	**58** *290*
	34CLIP	0.104/ .125	5/8	**62** *310*	---- ----	**106** *528*	---- ----	**44** *220*	---- ----	---- ----	---- ----
	38HSMP034, 12HSMP034 34HSMP034, 10HSMP034 114HSMP034, 14TRHMP034 38TRHMP034, TSHMP034 12CCMP034L, 34CCMP034L	0.104/ .125	5/8	**60** *357*	**117** *587*	**107** *533*	**191** *957*	**54** *269*	**230** *1150*	**71** *357*	**123** *613*
POWDER ASSEMBLIES	M100BB, 38HSSS10 12HSSS10, 34HSSS10 10HSSS10, TSHSS10 12CCSS10L, 34CCSS10L 14TRHSS10, 38TRHSS10	0.125/ .150	3/4	**107** *559*	**213** *1067*	**161** *803*	**248** *1240*	**96** *478*	**231** *1156*	**102** *512*	**166** *831*

* ESR-1955 pin data applies. **Note 1: ALLOWABLE** loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font. **Note 2:** Testing conducted in accordance with ICC AC70 & ASTM E1190 **Note 3:** Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5. **Note 4:** Values shown in concrete are for fastener only. Connected members must be investigated separately. **Note 5:** Cyclic, fatigue, shock loads and other design criteria may require a different safety factor. **Note 6:** Job-site testing may be required to determine actual job site values. **Note 7:** Minimum edge distance is 3 inches unless otherwise approved. In hollow block applications, no more than one fastener per cell. **Note 8:** For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa. Tables converted to metric are available on our website.

GAS FASTENERS IN STEEL

PART NUMBER	SHANK DIA. (INCH)	TYPE OF SHANK	INSTALLED IN A36 STRUCTURAL STEEL STEEL THICKNESS INCHES **ALLOWABLE LOAD** – *Ultimate Load*					
			3/16 (.1875)		1/4 (.250)		3/8 (.375)	
			TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)
FPP012	0.109	SMOOTH	**200** *1047*	**315** *1570*	**230** *1220*	**305** *1526*	**210** *1048* [7]	**215** *1076* [7]
M012 FPP012S	0.104/.118	SMOOTH	----- -----	----- -----	**148** *744*	**157** *787*	**166** *832* [7]	**157** *787* [7]
T3012	0.125	SMOOTH	**63** *676*	**162** *1356*	**239** *1285*	**211** *1417*	**113** *914* [8]	**197** *1327* [8]
			INSTALLED IN ASTM A 572 GRADE 50 STEEL STEEL THICKNESS INCHES					
T3012	0.125	SMOOTH	**103** *733*	**222** *1682*	**147** *950*	**119** *973*	**147** *856* [9]	**112** *1014* [9]

Note 1: ALLOWABLE loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font. **Note 2:** Testing conducted in accordance with ICC AC70 & ASTM E1190. **Note 3:** Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5. **Note 4:** Cyclic, fatigue, shock loads and other design criteria may require a different safety factor. **Note 5:** Job site testing may be required to determine actual job site values. **Note 6:** Values shown are for fastenings that have the entire pointed end of the fastener driven through the steel plate; except as noted below. **Note 7:** Fastener penetration is .31" minimum. **Note 8:** Fastener penetration is .29" minimum. **Note 9:** Fastener penetration is .27" minimum. **Note 10:** For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa
Tables converted to metric are available on our website.

PLY138 TrakFast Plywood to Steel Pin Performance Tables

ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES IN POUNDS PER FOOT FOR HORIZONTAL PLYWOOD DIAPHRAGMS WITH STEEL FRAMING

PLYWOOD GRADE	MINIMUM STEEL GAGE [4, 6]	MINIMUM PANEL THICKNESS (Inches)	BLOCKED DIAPHRAGM PIN SPACING (Inches) [5, 6] Pin spacing at diaphragm boundaries (all cases), at continuous panel edges parallel to load (cases 3 & 4) and at all panel edges (cases 5 & 6) ALLOWABLE LOAD				UNBLOCKED DIAPHRAGM PIN SPACING (Inches) [5, 6] Pins spaced 6 inches max. at supported edges	
			6	4	2-1/2	2	Case 1 (no unblocked edges or continuous joints parallel to load)	All other configurations (cases 2, 3, 4, 5 and 6)
			Pin spacing at other panel edges					
			6	6	4	3		
Structural 1	20	7/16	**185**	**280**	**420**	**475**	**185**	**140**
	16	15/32	**205**	**305**	**460**	**520**	**205**	**140**
Grades other than Structural 1	20	7/16	**165**	**250**	**380**	**430**	**165**	**125**
	16	15/32	**185**	**275**	**415**	**470**	**185**	**140**

Note 1: These values are for short-time loads due to wind or earthquake and shall be reduced by 25 percent for normal loading.

Note 2: The pin shall be long enough to penetrate through the thickness of the steel a minimum of 1/4 inch.

Note 3: Minimum width of framing is 1-1/2 inches.

Note 4: These shear values also apply to framing made of thicker steel.

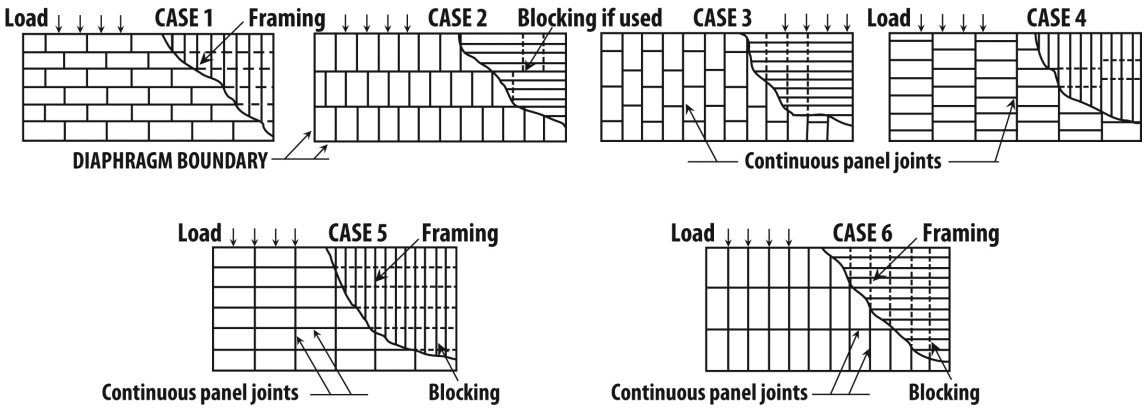
Note 5: Spacing of fasteners along intermediate framing members is 12 inches on center.

Note 6: The minimum panel edge distance is 3/8 inch.

Note 7: Values shown reflect a 5:1 safety factor.

Note 8: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.



Note: Framing is permitted to be oriented in either direction for diaphragms, provided sheathing is designed for vertical loading.

ALLOWABLE WITHDRAWAL LOADS IN POUNDS PER FASTENER DUE TO WIND OR SEISMIC FORCES FOR PLYWOOD AND LUMBER ATTACHED TO STEEL FRAMING [1, 2, 3, 4]

PIN DIAMETER (Inches)	MINIMUM STEEL THICKNESS (Gage or Inches)	MINIMUM THICKNESS OF PLYWOOD (Inches) ALLOWABLE LOAD – *Ultimate Load*					
		3/8	7/16	15/32	19/32	23/32	1-1/8
0.100	22	**15**	**15**	-----	-----	-----	-----
0.100	20	**20**	**25**	**25**	**25**	-----	-----
0.100	18	**30**	**35**	**40**	**40**	-----	-----
0.100	16	**40**	**45**	**60**	**60**	-----	-----

Note 1: Plywood shall be Structural 1 rated. For other grades, values shall be reduced by 10 percent.

Note 2: These values are for loads due to wind or earthquake and shall be reduced by 25 percent for other applications.

Note 3: Minimum panel edge distance is 3/8 inch.

Note 4: The pin shall be long enough to penetrate through the metal a minimum of 1/4 inch.

Note 5: Values shown reflect a 8:1 safety factor.

Note 6: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

PLY138 TrakFast Plywood to Steel Pin Performance Tables

ALLOWABLE SHEAR FOR WIND FORCES IN POUNDS PER FOOT FOR PLYWOOD SHEAR WALLS WITH STEEL FRAMING

PLYWOOD GRADE	MINIMUM STEEL GAGE [5]	MINIMUM PANEL THICKNESS (Inches)	PIN SPACING, ALL PANEL EDGES (Inches) ALLOWABLE LOAD			
			6	4	3	2
Structural 1	22	3/8 [6]	120	180	240	305
	22	7/16 [6]	130	195	260	330
	22	15/32	145	215	290	365
	20	3/8 [6]	155	235	310	395
	20	7/16 [6]	170	255	340	435
	20	15/32	205	305	410	520
Grades other than Structural 1	22	3/8 [6]	110	165	215	275
	22	7/16 [6]	120	175	235	300
	22	15/32	130	195	260	330
	20	3/8 [6]	140	210	280	360
	20	7/16 [6]	155	230	310	390
	20	15/32	185	275	370	470

Note 1: Values are for loads imposed by wind and shall be reduced by 25 percent for normal loading.

Note 2: The pin shall be long enough to penetrate through the metal framing a minimum of 1/4 inch.

Note 3: The minimum panel edge distance for pin placement is 3/8 inch.

Note 4: Spacing of fasteners along intermediate framing members is 6 inches on center for 3/8 inch and 7/16 inch panels when studs are 24 inches on center and 12 inches on center when studs are 16 inches on center. For other panel thickness, spacing along intermediate framing members is 12 inches from center.

Note 5: Framing to be spaced 24 inches on center or closer except as provided in Footnote 6.

Note 6: The values for 3/8-inch and 7/16-inch panels may be increased by 20 percent and 10 percent, respectively, for framing spaced 16 inches on center.

Note 7: Values shown reflect a 5:1 safety factor.

Note 8: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

ALLOWABLE LATERAL LOADS IN POUNDS PER FASTENER DUE TO WIND OR SEISMIC FORCES FOR STRUCTURAL 1 PLYWOOD AND LUMBER ATTACHED TO STEEL FRAMING [1, 2, 3, 4, 6]

PIN DIAMETER (Inches)	MINIMUM STEEL THICKNESS (Gage or Inches)	MINIMUM THICKNESS OF PLYWOOD (Inches) ALLOWABLE LOAD					
		3/8	7/16	15/32	19/32	23/32	1-1/8
0.100	22	80	80	80	80	80	80
0.100	20	105	105	115	115	115	115
0.100	16	105	105	115	170	170	170

Note 1: Plywood shall be Structural 1 rated. For other grades, values shall be reduced by 10 percent.

Note 2: These values are for loads due to wind or earthquake and shall be reduced by 25 percent for other applications.

Note 3: Minimum panel edge distance for placement is 1 inch from the fastener to the sheathing edge measured in the direction of the load and 3/8 inch measured perpendicular to the direction of the load.

Note 4: The pin shall be long enough to penetrate through the metal a minimum of 1/4 inch.

Note 5: Values for 16 gage also apply to 14 gage.

Note 6: The above values apply to groups of at least five fasteners. For fewer fasteners in a group, use one-half of the tabulated value.

Note 7: Values shown reflect a 5:1 safety factor.

Note 8: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

Ramset fasteners may be specified by their type or catalog number to satisfy fastening requirements.

PIN SPECIFICATIONS

- Made from AISI 1060-1065 steel. Austempered to a core hardness of 52-56 Rc
- Typical tensile strength: 270,000 psi
- Typical shear strength: 162,000 psi
- STANDARD FINISHES
  - Proprietary black
  - Mechanical zinc plate to a minimum thickness of .0002 meets requirements of ASTM B695

APPROVALS/LISTINGS

ICC Evaluation Service, Inc.

#ER-1147 Sill Plate
#ESR-1799 Powder Pins & Clips (formerly ER-1639)
#ER-3618 Ladd
#ER-5001 TrakFast Pins
#ESR-1955 T3 Pins

City of Los Angeles

#RR-22668 Powder pins
#RR-24279 Ladd
#RR-25264 TrakFast pins

Performance Tables

FASTENERS IN NORMAL WEIGHT CONCRETE

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH **ALLOWABLE LOAD** – *Ultimate Load*											
			2000 PSI				4000 PSI				6000 PSI			
			TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)	
1500/ 1600 SERIES	0.145	3/4	**50**	*655*	**66**	*739*	**100**	*511*	**104**	*552*	-----	-----	-----	-----
		1	**152**	*943*	**166**	*1229*	**157**	*937*	**182**	*1342*	-----	-----	-----	-----
		1-1/4	**159**	*1078*	**265**	*1665*	**179**	*1043*	**267**	*1538*	-----	-----	-----	-----
		1-1/2	**154**	*1450*	**340**	*2027*	**209**	*1357*	**342**	*1712*	-----	-----	-----	-----
SP	0.150	3/4	-----	-----	-----	-----	**150**	*803*	**105**	*786*	**81**	*493*	**82**	*454*
SP SERIES	.150/.180	1	**154**	*1043*	**200**	*1173*	**243**	*1307*	**175**	*1037*	**189**	*1125*	**210**	*1177*
		1-1/4	**207**	*1553*	**230**	*1636*	**298**	*1749*	**218**	*1471*	**213**	*1568*	**305**	*1780*
		1-1/2	-----	-----	-----	-----	**384**	*2126*	**391**	*1957*	**239**	*1886*	**594**	*2968*
3300 SERIES	0.180	1	**196**	*1084*	**100**	*1328*	**255**	*1504*	**284**	*1557*	-----	-----	-----	-----
		1-1/4	**241**	*1207*	**329**	*1710*	**294**	*1574*	**373**	*2104*	-----	-----	-----	-----
		1-1/2	**254**	*1601*	**379**	*1971*	**419**	*2239*	**501**	*2505*	-----	-----	-----	-----
1900	0.145	3/4	**105**	*694*	**71**	*458*	**101**	*685*	**99**	*627*	-----	-----	-----	-----
9100 STUD	0.205	1	**187**	*988*	**212**	*1385*	**186**	*1070*	**303**	*1618*	-----	-----	-----	-----
		1-1/4	**262**	*1450*	**304**	*1674*	**335**	*2161*	**400**	*2000*	-----	-----	-----	-----

Note 1: **ALLOWABLE** loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font.

Note 2: Testing conducted in accordance with ICC AC70 & ASTM E1190.

Note 3: Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5.

Note 4: Values shown in concrete are for the fastener only. Connected members must be investigated separately.

Note 5: Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor.

Note 6: Job site testing may be required to determine actual job site values.

Note 7: Minimum edge distance is 3 inches unless otherwise approved.

Note 8: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

Performance Tables

FASTENERS IN STEEL

PART NUMBER SERIES	SHANK DIA. (INCH)	TYPE OF SHANK	INSTALLED IN A36 STRUCTURAL STEEL–STEEL THICKNESS (INCHES) **ALLOWABLE LOAD** – *Ultimate Load*											
			3/16		1/4		3/8		1/2		3/4			
			TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)		
1500/ 1600	0.145	SMOOTH	**81** *790*	**373** *2039*	**181** *1269*	**273** *1642*	**397** *2169*	**489** *2771*	**243** *1328*[8]	**277** *1514*[8]	---- ----	---- ----		
		KNURLED	**296** *1633*	**636** *3516*	**584** *3384*	**659** *3822*	**680** *3755*	**730** *4030*	**253** *1459*[8]	**293** *1632*[8]	---- ----	---- ----		
SP	0.150	SMOOTH	**385** *2107*	**662** *3618*	**445** *2549*	**477** *2736*	**393** *2145*	**574** *3137*	**948** *5180*	**597** *3500*	**234** *1244*[8]	**356** *1895*[8]		
3300	0.180	SMOOTH	**281** *1536*	**580** *3169*	**385** *2212*	**507** *2931*	**460** *2631*	**644** *3518*	**641** *3499*	**684** *3739*	---- ----	---- ----		
9100	0.205	KNURLED	**160** *1469*	**931** *5084*	**350** *3115*	**617** *3542*	**843** *4605*	**803** *4391*	**565** *3086*[9]	**547** *3373*[9]	---- ----	---- ----		

PART NUMBER SERIES	SHANK DIA. (INCH)	TYPE OF SHANK	INSTALLED IN A572 GRADE 50 STRUCTURAL STEEL–STEEL THICKNESS (INCHES) **ALLOWABLE LOAD** – *Ultimate Load*											
			3/16		1/4		3/8		1/2		3/4			
			TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)		
1500/ 1600	0.145	SMOOTH	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----		
		KNURLED	**260** *1609*	**499** *3182*	**579** *3411*	**725** *4272*	**383** *2216*[7]	**595** *3431*[7]	---- ----	---- ----	---- ----	---- ----		
SP	0.150	SMOOTH	**356** *2123*	**569** *3394*	**554** *3232*	**637** *3710*	**604** *3447*	**602** *3437*	**814** *4473*[9]	**820** *4503*[9]	**243** *1362*[8]	**381** *2141*[8]		
3300	0.180	SMOOTH	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----		
9100	0.205	KNURLED	**365** *2175*	**903** *5385*	**697** *4061*	**907** *5285*	**155** *842*[7]	**376** *2143*[7]	---- ----	---- ----	---- ----	---- ----		

Note 1: **ALLOWABLE** loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font.

Note 2: Testing conducted in accordance with ICC AC70 & ASTM E1190.

Note 3: Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5.

Note 4: Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor.

Note 5: Job site testing may be required to determine actual job site values.

Note 6: Values shown are for fastenings that have the entire pointed end of the fastener driven through the steel plate; except as noted below.

Note 7: Fastener penetration is 3/8" minimum

Note 8: Fastener penetration is 7/16" minimum

Note 9: Fastener penetration is 1/2" minimum

Note 10: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

FASTENERS IN LIGHTWEIGHT CONCRETE

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	ALLOWABLE WORKING VALUES INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE **ALLOWABLE LOAD** – *Ultimate Load*							
			3000 PSI LIGHTWEIGHT W/DECKING				3000 PSI LIGHTWEIGHT			
			LOWER FLUTE TENSION		LOWER FLUTE SHEAR		TENSION		SHEAR	
1500 SERIES	0.145	3/4	**76**	*395*	**260**	*1409*	**167**	*837*	**179**	*894*
		1	**134**	*668*	**265**	*1505*	**200**	*998*	**228**	*1141*
		1-1/4	**157**	*784*	**269**	*1344*	**333**	*1664*	**400**	*2090*
		1-1/2	**233**	*1163*	**346**	*1728*	**391**	*1957*	**410**	*2050*
SP SERIES	.150/.180	1	**119**	*593*	**336**	*1679*	**226**	*1129*	**250**	*1249*
		1-1/4	**175**	*957*	**372**	*1860*	**329**	*1644*	**377**	*1885*
		1-1/2	**179**	*1055*	**426**	*2128*	**406**	*2030*	**380**	*1900*
9100 SERIES	0.205	3/4	**70**	*351*	**277**	*1386*	-----	-----	-----	-----
		1	**112**	*559*	**378**	*1891*	-----	-----	-----	-----
		1-1/4	**118**	*689*	-----	-----	-----	-----	-----	-----

Note 1: **ALLOWABLE** loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font.

Note 2: Testing conducted in accordance with ICC AC70 & ASTM E1190.

Note 3: Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5.

Note 4: Values shown in concrete are for the fastener only. Connected members must be investigated separately.

Note 5: Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor.

Note 6: Job site testing may be required to determine actual job site values.

Note 7: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

Performance Tables

ANGLE CLIP IN CONCRETE

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH **ALLOWABLE LOAD** – *Ultimate Load*											
			4000 PSI						6000 PSI					
			TENSION (LBS)		SHEAR (LBS)		OBLIQUE (LBS)		TENSION (LBS)		SHEAR (LBS)		OBLIQUE (LBS)	
SDC100 SDC125	0.145	7/8	**115**	*575*	**120**	*1014*	**145**	*726*	-----	-----	-----	-----	-----	-----
SDC125	0.145	1-1/8	**130**	*744*	**167**	*1090*	**205**	*1032*	-----	-----	-----	-----	-----	-----
SPC78	0.150	3/4	**155**	*897*	**188**	*1050*	-----	-----	**150**	*788*	**153**	*949*	**140**	*769*
SPC114	.150/.180	1-1/8	**127**	*811*	**226**	*1130*	**181**	*904*	**169**	*853*	**300**	*1500*	**223**	*1114*

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	ALLOWABLE WORKING VALUES INSTALLED IN 3000 PSI LIGHTWEIGHT CONCRETE **ALLOWABLE LOAD** – *Ultimate Load*									
			3000 PSI LIGHTWEIGHT WITH METAL DECKING									
			LOWER FLUTE TENSION (LBS)		LOWER FLUTE SHEAR (LBS)		LOWER FLUTE OBLIQUE (LBS)		UPPER FLUTE TENSION (LBS)		UPPER FLUTE SHEAR (LBS)	
SDC100	0.145	7/8	**67**	*335*	**237**	*1186*	**90**	*448*	**104**	*571*	**310**	*1678*
SDC125	0.145	1-1/8	**94**	*471*	**276**	*1378*	**119**	*596*	**106**	*528*	**319**	*1597*
SPC78	0.150	3/4	**59**	*293*	**202**	*1109*	**65**	*323*	**84**	*419*	**324**	*1622*
SPC114	150/.180	1-1/8	**157**	*786*	**272**	*1358*	**153**	*766*	**180**	*899*	**334**	*1673*

Note 1: **ALLOWABLE** loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font.

Note 2: Testing conducted in accordance with ICC AC70 & ASTM E1190.

Note 3: Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5.

Note 4: Values shown in concrete are for the clip assembly only. Connected members must be investigated separately.

Note 5: Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor.

Note 6: Job site testing may be required to determine actual job site values.

Note 7: Minimum edge distance is 3 inches unless otherwise approved.

Note 8: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.

LADD 652 ANGLE CLIP ASSEMBLY

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	ALLOWABLE WORKING VALUES INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH **ALLOWABLE LOAD** – *Ultimate Load*					
			3000 PSI				4000 PSI	
			TENSION (LBS)		SHEAR (LBS)		TENSION (LBS)		SHEAR (LBS)	
LADD CEILING SYSTEM	0.152	1-1/8	**211**	*1688*	-----	-----	**193**	*1544*	-----	-----

Note 1: **ALLOWABLE** loads are shown in the **LARGE BOLD** font, *Ultimate* loads are shown in *smaller italic* font.

Note 2: Except as noted, values shown reflect an 8 to 1 safety factor.

Note 3: Values shown are for concrete at the designed strength and are for the clip system only.

Note 4: Cyclic, fatigue or shock loads and other design criteria may require a different safety factor.

Note 5: Job site testing may be required to determine actual job site values.

Note 6: Edge distance is 3 inches unless otherwise approved.

Note 7: For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

Tables converted to metric are available on our website.