

HILTI, INC. - Example #1



Kwik Bolt 3 Expansion Anchor

1

Anchoring Systems

1.1 Product Description

The Kwik Bolt 3 (KB3) is a torque controlled expansion anchor, which provides consistent performance for a wide range of mechanical anchor applications. This anchor series is available in carbon steel with zinc electroplated coating, carbon steel with hot dipped galvanized coating, 304 stainless steel and 316 stainless steel versions. The threaded stud version of the anchor is available in a variety of diameters ranging from 1/4" to 1" depending on the steel and coating type. Applicable base materials include normal weight concrete, structural lightweight concrete, lightweight concrete over metal deck and concrete grout filled masonry.

Guide Specifications

Anchor: Expansion anchors shall be Kwik Bolt 3 (KB3) supplied by Hilti, Inc. meeting the description in Federal Specification A-A 1923A, Type 4 and shall bear a length identification mark visible after installation. Anchor bodies shall be manufactured to meet one of the following conditions: 1. The carbon steel electroplated anchor coating shall conform to ASTM B633 with a minimum thickness of 5µm. 2. The carbon steel hot dipped galvanized anchor body, nut and washer coating shall conform to ASTM A 153, Class C. The expansion sleeve conforms to AISI 316. 3. Anchor body, nut and washer conform to AISI 304. The expansion sleeve conforms to AISI 316. 4. Anchor body, nut, washer and expansion sleeve conform to AISI 316.

Listings and Approvals

- International Code Council (ICC-ES) Evaluation Service Report ESR-1385 Seismically recognized under AC01 dated April 2002
- City of Los Angeles Report (COLA) - approval pending
- UL 203, Pipe Hanger Equipment for Fire Protection Services
- FM Approval Standard Pipe Hanger Component for Automatic Sprinkler
- Metropolitan Dade Notice of Product Approval - approval pending

(Please refer to the reports to verify that the anchor type and diameter specified is included)

- Qualified under an NQA-1 Nuclear Quality Program

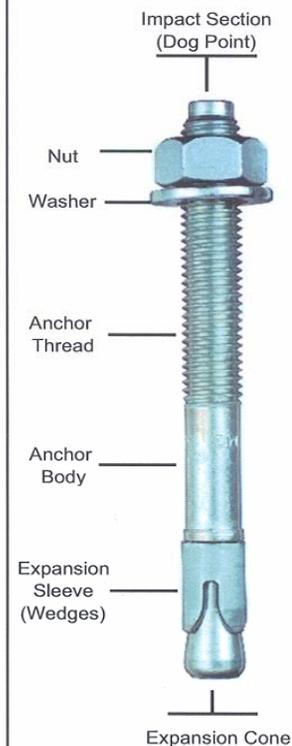
Product Features

- Length identification code facilitates quality control and inspection after installation.
- Through fixture installation and variable thread lengths improve productivity and accommodate various base plate thicknesses.
- Raised impact section (Dog Point) prevents thread damage during installation.
- Anchor size is same as drill bit size for easy installation. For temporary applications anchors may be driven into drilled holes after usage.
- Mechanical expansion allows immediate load application.
- Consistent performance in concrete, lightweight concrete, lightweight over metal deck and grout filled concrete block base materials.
- Anchors tested to combined tension and shear load requirements as defined by ACI 318-02 Appendix-D.

Installation

Drill hole in concrete, structural lightweight concrete, or grout filled concrete block using a Hilti carbide tipped drill bit and a Hilti rotary hammer drill. Remove dust from the hole with oil free compressed air. Alternately for 1/2, 5/8, 3/4, and 1 inch diameter Kwik Bolt 3 anchors, the hole may be drilled using a matched tolerance Hilti DD-B or DD-C wet diamond core bit for anchoring applications. The slurry must be flushed from the diamond cored hole prior to anchor installation. The minimum hole depth must exceed the anchor embedment prior to torquing by one hole diameter. Drive the anchor into the hole using a hammer. A minimum of six threads must be below the surface of the fixture. Tighten the nut to the recommended installation torque.

1	Kwik Bolt 3
1.1	Product Description
1.2	Material Specification
1.3	Technical Data
1.4	Installation Instructions
1.5	Ordering Information



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US www.us.hilti.com
Canada www.ca.hilti.com

HILTI, INC. - Example #2



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Kwik Bolt 3 Expansion Anchor

Anchoring Systems

1.2 Material Specification

Carbon steel with electroplated zinc

- All Carbon Steel Kwik Bolt 3, Long Thread Kwik Bolt 3 and Rod Coupling Anchors, excluding the 3/4 x 12 and 1 inch diameter sizes, have the following minimum tensile bolt fracture loads:

Anchor Diameter	1/4"	3/8"	1/2"	5/8"	3/4"
Fracture Load min.	2900 lbs	7200 lbs	12400 lbs	19600 lbs	28700 lbs

- All 3/4 x 12, 1 inch diameter sizes and countersunk Kwik Bolt anchors have anchor bodies with the following minimum mechanical properties
- Carbon steel anchor components plated in accordance with ASTM B 633 to a minimum thickness of 5µm.
- Nuts conform to the requirements of ASTM A 563, Grade A, Hex.
- Washers meet the requirements of ASTM F 844.
- Expansion sleeves (wedges) are manufactured from carbon steel with the following exceptions:
 - All 1/4 in. diameter anchors, excluding the post-nut series, have stainless steel wedges.
 - The KB3 3/4x12 has stainless steel wedges.
 - All 1 in. diameter anchors have stainless steel wedges.

Anchor Diameter	≤ 5/8"	≥ 3/4"
Tensile Strength	105 ksi min.	88 ksi min.
Yield Strength	90 ksi min.	75 ksi min.

Carbon steel with hot-dip galvanized (HDG) coating

- Anchor bodies manufactured from carbon steel meeting a minimum fracture load after forming:
- Carbon steel anchor components hot-dip galvanized according to ASTM A 153, class C (43µm min.).
- Nuts conform to the requirements of ASTM A 563, Grade A, Hex.
- Washers meet the requirements of ASTM F 844.
- Expansion sleeves (wedges) are manufactured from stainless steel.

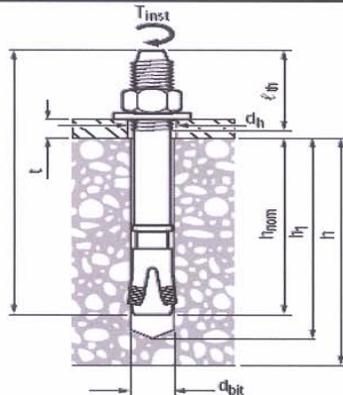
Anchor Diameter	1/2"	5/8"	3/4"
Fracture Load min.	12400 lbs	19600 lbs	28700 lbs

Stainless Steel

- Anchor bodies smaller than 3/4", excluding countersunk Kwik Bolt Series, are produced from AISI 304 or 316 stainless steel meeting a minimum fracture load after forming:
- Anchor bodies 3/4" and larger and all stainless steel countersunk Kwik Bolt series are produced from AISI 304 or 316 stainless steel having minimum mechanical properties:
- Nuts meet the dimensional requirements of ASTM F 594.
- Washers meet the dimensional requirements of ANSI B18.22.1, Type A, plain.
- Expansion Sleeve for AISI 304 and 316 anchors are made from AISI 316, all nuts and washers for AISI 304 and 316 anchors are manufactured from AISI 304 and 316, respectively.

Anchor Diameter	1/4"	3/8"	1/2"	5/8"
Fracture Load min.	2900 lbs	7200 lbs	12400 lbs	21900 lbs

Anchor Diameter	< 5/8"	≥ 3/4"
Tensile Strength	90 ksi min.	76 ksi min.
Yield Strength	76 ksi min.	64 ksi min.



Refer to Kwik Bolt 3 Specification table under Section 1.3, for a listing and specification of anchor specific and installation variables.
See Kwik Bolt 3 anchor product line table under Section 1.5 for full list of anchor length (l) and thread length (l_{th}) configurations.

Combined Shear and Tension Loading

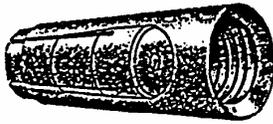
$$\left(\frac{N_d}{N_{rec}}\right)^{5/3} + \left(\frac{V_d}{V_{rec}}\right)^{5/3} \leq 1.0$$

Refer to Section 4.1.2.7 of 2005 Hilti Product Technical Guide

HILTI, INC. - Example #3

The Hilti Drop-In Anchor

Product Details



Advantages:

Shallow embedment depth

Internal thread

Anchor is flush with base material

Internal plug

Material

Anchor material is SAE 1110M for the 1/4", 3/8" and 1/2" HDI's.

Anchor material is AISI 12L14 steel, meeting ASTM specification A 108 for 3/8" & 1/2" HDI's.

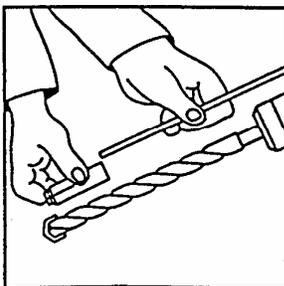
Anchor material is AISI 303 for stainless steel anchors.

Plated with dull zinc finish for corrosion protection in accordance with ASTM B633, Sc. 1, Type III.

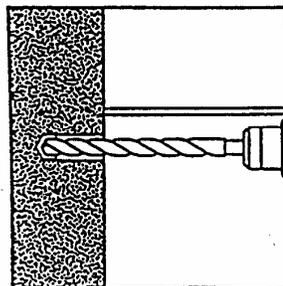
Specification Table

Details		Anchor Size				
D	bolt size	1/4"	3/8"	1/2"	5/8"	3/4"
BD	bit diameter	3/8"	1/2"	5/8"	27/32"	1"
E	rec. min. depth of embedment					
L	anchor length	1"	1 1/16"	2"	2 9/16"	3 9/16"
HD	hole depth					

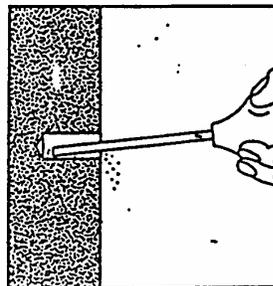
Setting Instructions



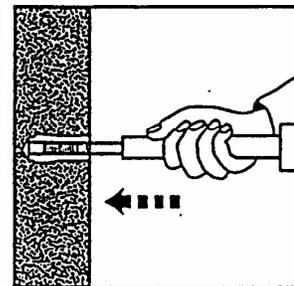
1. Adjust depth gauge



2. Hammer drill hole



3. Clean hole



4. Install anchor using proper setting tool. Setting tool to be driven into anchor until setting tool shoulder meets top of anchor.

HILTI, INC. - Example #4



4.3.1

Anchoring Systems
HVA Adhesive System

4.3.1.1 PRODUCT DESCRIPTION

The Hilti HVA system is a heavy duty, two component adhesive anchor consisting of a self-contained adhesive capsule and either a threaded rod with nut and washer or an internally threaded insert.

Product Features

- High loading capacity
- Does not exert expansion pressure on base materials
- Close edge distance allowance
- Tight anchor spacing allowance
- Excellent performance in matched tolerance diamond-cored holes
- Excellent elevated temperature performance
- Excellent performance in freezing and thawing conditions
- Seismic tested per ICBO AC508, ASTM E-1512

Guide Specifications

Masterformat section: 03250 (Concrete accessories)
Related Sections: 03200 (Concrete Reinforcing—Reinforcing Accessories)
05050 (Metal Fabrication)
05120 (Structural Steel)

Adhesive anchors shall consist of an all-thread anchor rod, nut, washer and adhesive capsule. Alternatively, adhesive anchors shall consist of a steel insert and an adhesive capsule.

Anchor Rod—Shall be provided with 45 degree chisel point to provide proper mixing of the adhesive components. Anchor rod shall be manufactured to meet the following requirements: 1. ASTM A36 (standard carbon steel anchor) 2. ASTM A193 Grade B7 (Type 2) 3. AISI 304 or AISI 316 stainless steel meeting the mechanical requirements of ASTM F-593 (Condition CW).

Nuts and Washers—Shall be furnished to meet the requirements of the above anchor rod specifications.



HVU Adhesive Capsule



HAS Anchor Rod Assembly with nut and washer



HIS Internally Threaded Insert



Rebar (Not supplied by Hilti)

Adhesive Capsule—Shall consist of a dual chamber foil capsule. The resin material shall be vinyl urethane.

Steel Insert—The internally threaded insert shall be manufactured with a 45 degree (from central axis) chisel-pointed end. The insert shall be manufactured from carbon steel or stainless steel material which meets minimum ultimate tensile strengths of 71 and 74 ksi respectively.

The adhesive anchoring system shall be the Hilti HVA anchoring system, consisting of the Hilti HVU adhesive capsule and the Hilti HAS anchor rod or HIS internally threaded insert.

Installation—Adhesive anchors to be installed in holes drilled using the specified diameter of Hilti carbide-tipped drill bit or matched tolerance DCI core bit. Anchors shall be installed in strict accordance to section 4.3.1.4. Anchors shall not be disturbed until cure time has elapsed.

Listings/Approvals

- International Conference of Building Officials (ICBO): Evaluation Report pending
- Southern Building Code Congress International (SBCCI): Report pending
- City of Los Angeles (COLA): Research Report pending
- Metro-Date Acceptance No. pending

4.3.1.2 MATERIAL SPECIFICATIONS

	MECHANICAL PROPERTIES	
	f_y ksi (MPa)	min. f_u ksi (MPa)
Standard HAS rod material meets the requirements of ASTM A36	36 (248)	58 (400)
High Strength or 'Super HAS' rod material meets the requirements of ASTM A193, Grade B7	105 (724)	125 (862)
Stainless HAS rod material meets the requirements of ASTM F593 (AISI 304) Condition CW 3/8" - 5/8"	65 (448)	100 (689)
Stainless HAS rod material meets the requirements of ASTM F593 (AISI 304) Condition CW 3/4" - 1 1/4"	45 (310)	85 (586)
HIS Insert 9SMNPB36K Carbon Steel Conforming to DIN 1651	56 (390)	71 (490)
HIS-R Insert X5CrNiMo17122 K700 Stainless Steel Conforming to DIN 17440	35 (241)	74 (510)
HAS Standard Nut material meets the requirements of ASTM A563, Grade A		
HAS Super Nut material meets the requirements of ASTM A563, Grade DH		
HAS Stainless Steel Nut material meets the requirements of ASTM F594		
HAS Standard Washer meets dimensional requirements of ANSI B18.22.1 Type A Plain		
HAS Super Washer meets the requirements of ASTM F436		
HAS Stainless Steel Washer meets dimensional requirements of ANSI B18.22.1 Type A Plain		
All standard HAS & HAS Super Rods (except 7/8"), HIS inserts, nuts & washers are zinc plated to ASTM B633 SC1		
7/8" HAS rods hot-dip galvanized in accordance with ASTM A153		
HVU Adhesive—Vinyl Urethane Resin with a Dibenzoyl Peroxide hardener		

Note: Special Order HAS rods, nuts and washers may vary from standard materials.

HILTI, INC. - Example #5

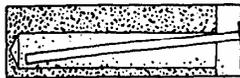
Anchoring Systems



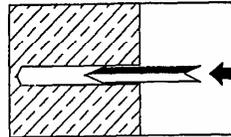
HVA Adhesive System

4.3.1

4.3.1.4 INSTALLATION INSTRUCTIONS—HAS ROD AND HIS INSERT



1. Set the drill depth gauge and drill a hole to the required hole depth.
IMPORTANT: Clean out dust and debris. Use compressed air or vacuum at bottom of the hole. When using a matched tolerance diamond core bit, flush hole with water from the bottom of the hole and allow concrete to dry.

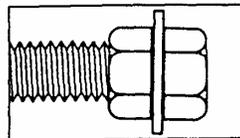


2. Insert appropriate diameter HVU adhesive capsule* into pre-drilled hole in base material.

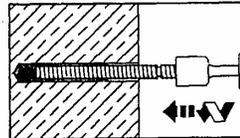
NOTE: The best method for setting multiple capsules is to crush the first capsule(s) into the hole and then insert the next capsule. **DO NOT** cut off capsules partially protruding from the hole.

*Capsule length is longer than standard embed. depth and will protrude from the hole.

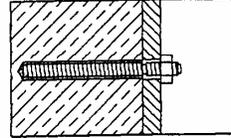
HAS Threaded Rods



3. Thread a nut on the HAS rod. Place a washer on top of the first nut and then thread a second nut down on top of the washer. Tighten the two nuts together "locking" the washer between them. The top nut should be flush with the top of the rod.

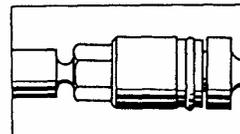


4. Insert a square drive shaft into the hammer drill and attach the proper impact socket. At the rotary hammer drill setting, engage the top nut of the HAS rod assembly with the socket and drive the rod down to the embedment mark.

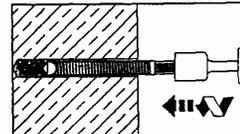


5. The set anchor rod may not be disturbed or loaded before the specified curing time elapses.

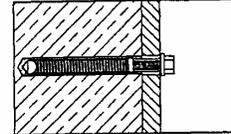
HIS Internally Threaded Insert



3. Insert the shaft with socket into the hammer drill, screw the setting tool into the HIS and place in the socket.

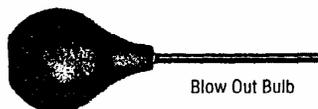


4. At the rotary hammer drill setting, drive the HIS until flush with the surface of the concrete.

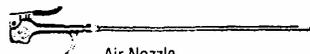


5. The set anchor can not be disturbed or loaded before the specified curing time elapses.

4.3.1.5 ORDERING INFORMATION



Blow Out Bulb



Air Nozzle

Description	Item No.	Use
Blow Out Bulb BB	00060503	For all hole sizes
Air Nozzle (Length 12") 3/8" THD	00089314	For all hole sizes
Air Nozzle (Length 24") 3/8" THD	00063964	For all hole sizes

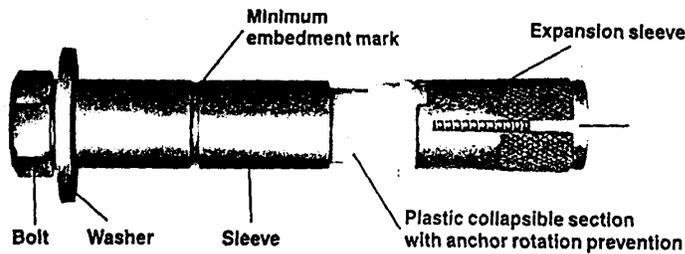
HILTI, INC. - Example #6

HSL Metric Heavy-Duty Expansion Anchor

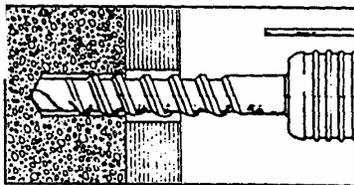
Reliable heavy-duty anchor for heavy/dynamic loads

Product Details

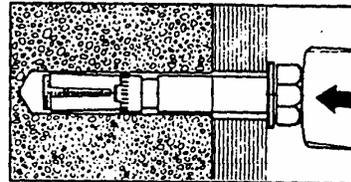
Hilti HSL Heavy-Duty Anchor



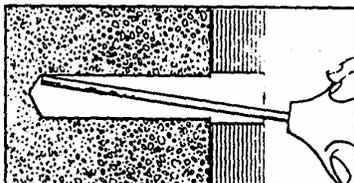
HSL Metric Installation Instructions



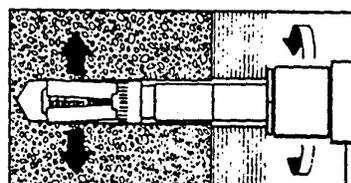
1. Drill a hole with the prescribed Hilti metric bit. Note: the HSL can be installed in a bottomless hole.



3. Using a hammer, tap the preassembled anchor through the object being anchored into the hole. The anchor should be seated firmly against the base plate. Note: do not expand the anchor by hand before tapping it into the hole.



2. Clean the hole using a blow-out bulb or compressed air.

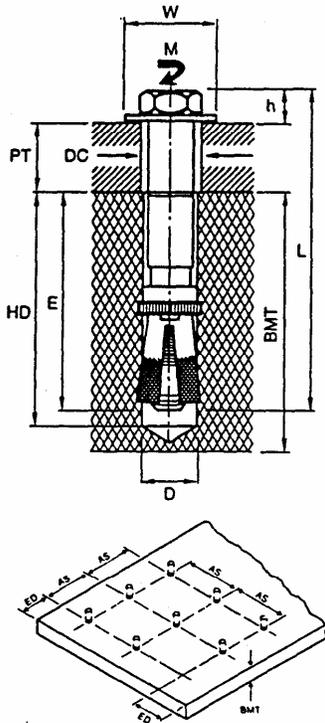


4. Tighten bolt or nut to the specified torque, using a torque wrench.

Note: When using an HSLB anchor no torque wrench is required. The torque cap shears off at the specified torque value.

HILTI, INC. - Example #7

HSL Metric Specification Table



Notes:

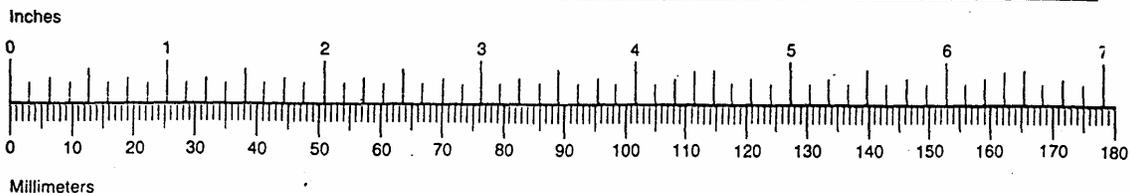
1. When using AS_{min} reduce the working load by 30%
2. When using ED_{min} and the load is a shear load, reduce the working load by 70%
3. When using ED_{min} and the load is a tensile load, reduce the working load by 30%
4. To convert mm's to inches divide by 25.4

Setting details		Thread size											
		M8/20	M8/40	M10/20	M10/40	M12/25	M12/50	M16/25	M16/50	M20/30	M20/60	M24/30	M24/60
D (mm)	drill bit dia.	12	15	18	24	28	32						
HD (mm)	hole depth	75	85	100	125	150	175						
E (mm)	min. depth of embedment	65	75	80	105	130	155						
AS	spacing required to obtain maximum working load (mm)	195	225	240	315	390	465						
AS min	Minimum allowable spacing between anchors (mm) Refer to note 1	65	75	80	105	130	155						
ED	Edge distance required to obtain maximum working load (mm)	162	187	200	262	325	387						
ED min	Minimum allowable edge distance (mm) Refer to notes 2 and 3	65	75	80	105	130	155						
PT (mm)	max. thickness fastened	20	40	20	40	25	50	25	50	30	60	30	60
L (mm)	anchor length	95	115	107	127	120	145	148	173	183	213	205	235
h (mm)	head height + washer	7.5	10	11	14	17	19						
M (ft.-lbs.)	max. tightening torque	20	40	60	150	300	525						
Max. gap (mm)		4	5	8	9	12	16						
Wrench Size (mm)	HSL/HSLG	13	17	19	24	30	36						
	HSLB	—	—	24	30	36	41						
DC (mm)	clearance hole	14-15	17-18	20-21	26-28	31-33	35-37						
W (mm)	washer dia.	20	25	30	40	45	50						
BMT (mm)	min. base material thickness	120	140	160	180	220	270						
Drill bit		TE-C12/20 TE-F-12/34	TE-C-15/25 TE-F-15/34	TE-C-18/20 TE-F-18/34	TE-C-24/25 TE-F-24/32	TE-S2, TE72, TE92	TE-F-28/37	TE-F-32/37					
Hammer Drill		TE10, TE12S, TE22, TE52, TE72	TE10, TE12S, TE22, TE52, TE72	TE10, TE12S, TE22, TE52, TE72, TE92	TE22, TE52, TE72, TE92	TE52, TE72, TE92	TE52, TE72, TE92	TE52, TE72, TE92					

The HSL Metric Anchor Spacings and Edge Distances are Calculated Using the Following Information:

	Anchor Spacing			Edge Distance Shear Load Only			Edge Distance Tension Load Only		
	AS	AS _{min}	f _{AS}	ED	ED _{min}	f _{ED}	ED	ED _{min}	f _{ED}
HSL	3.0E	1.0E	0.7	2.5E _{min}	1.0E _{min}	0.3	2.5E	1.0E	0.7

Metric Ruler



ITW RAMSET/RED HEAD ANCHORS - Example #1



MADE
 IN
 U.S.A.

ITW Ramset/Red Head



TRUBOLT WEDGE

**DEPENDABLE, HEAVY DUTY, INSPECTABLE,
 WEDGE TYPE EXPANSION ANCHOR**

- Versatile fully threaded design is standard on sizes up to 3/4" diameter and 7" length.
- Anchor diameter equals hole diameter.
- One piece stainless steel expander clip resists corrosion.
- 360° contact with concrete assures full expansion for reliable working loads.
- Non bottom-bearing, may be used in hole depth exceeding anchor length.
- Supplied complete with nut and washer.
- Can be installed through the work fixture, eliminating hole spotting.
- Inspectable torque values, indicating proper installation.
- Heavy duty pull-out and shear capacities.

MODELS/ VARIATIONS

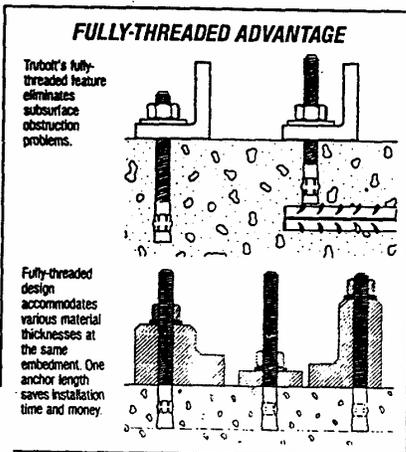
Zinc-plated Carbon Steel—standard anchor for all structural and in-plant uses. Zinc-plated in accordance with Federal specification QQ-Z-325C Type II, Class 3.

Galvanized Steel—provides protection from mildly humid, corrosive or brine atmospheres. Outdoor applications include fencing, gates, handrails, docks, conveyors, highway guard rails, signs, lighting and safety devices. Galvanized in accordance with ASTM A153 Class C. (Nuts and washers are also hot dipped galvanized.)

Stainless Steel—for protection in humid, highly corrosive and acidic environments. Used extensively in architecture to mount aluminum and stainless steel window frames and curtain walls. Bolt body 302HQ, 303, or 316 stainless steel. Type 302HQ stainless steel exhibits the same corrosion resistance as Type 304 stainless. It meets ASTM A276 and A479 specifications.

APPROVALS/LISTINGS

- Meets or exceeds U.S. Government G.S.A. Specification FF-S-325 Group II, Type 4, Class I.
- Underwriters Laboratories.
 - Factory Mutual.
 - ICBO Evaluation Service, Inc. Report #1372.
 - City of Los Angeles, Report #RR2748.
 - Metro Dade County Florida.
 - SBCCI Compliance Report #9053.
 - California State Fire Marshal.



INSTALLATION STEPS



1. Using a bit whose diameter equals the anchor diameter, drill hole to any depth exceeding minimum embedment. Clean hole.
2. Assemble anchor with nut and washer so that the top of the nut is flush with the top of the anchor. Drive anchor through material to be fastened so that nut and washer is flush with surface of material.
3. Expand anchor by tightening nut 3 to 5 turns, or to the specified torque requirement. (see selection chart)

See Installation Cautions on Back Page.

ITW RAMSET/RED HEAD ANCHORS - Example #2

Carbon Steel		Galvanized Steel		302HQ/303** Stainless Steel		316 Stainless Steel		Anchor Diameter & Drill Bit Size/Threads Per Inch	A Overall Length	B Max. Thickness of Material to be Fastened	D Min. Embedment in Concrete	Installation Torque (Ft. Lbs.)
Catalog Number	C Thread Length	Catalog Number	C Thread Length	Catalog Number	C Thread Length	Catalog Number	C Thread Length					
WS-1416* WS-1422* WS-1432*	3/4" 1-1/4" 2-1/4"			WW-1416* WW-1422* WW-1432*	3/4" 1-1/4" 2-1/4"	SWW-1416 SWW-1422	3/4" 3/4"	1/4"/20	1-3/4" 2-1/4" 3-1/4"	3/8" 7/8" 1-7/8"	1-1/8"	8
◆WS-3822* ◆WS-3826* ◆WS-3830* ◆WS-3836* ◆WS-3850*	1-1/8" 1-5/8" 1-7/8" 2-5/8" 2-1/2"			◆WW-3822* ◆WW-3826* ◆WW-3830* ◆WW-3836* ◆WW-3850*	1-1/8" 1-5/8" 1-7/8" 2-5/8" 2-1/2"	◆S-WW-3826 ◆S-WW-3830 ◆S-WW-3836	1-1/8" 1-1/8" 1-1/8"	3/8"/16	2-1/4" 2-3/4" 3" 3-3/4" 5"	3/8" 7/8" 1-1/8" 1-7/8" 3-1/8"	1-1/2"	25
◆WS-1226* ◆WS-1236* ◆WS-1242* ◆WS-1254* ◆WS-1270*	1-1/4" 2-1/4" 2-3/4" 3" 4-1/2"	◆WS-1226G* ◆WS-1242G* ◆WS-1254G* ◆WS-1270G*	1-1/4" 2-3/4" 3" 4-1/2"	◆WW-1226* ◆WW-1236* ◆WW-1242* ◆WW-1254* ◆WW-1270*	1-1/4" 2-1/4" 2-3/4" 3" 4-1/2"	◆S-WW-1226 ◆S-WW-1236 ◆S-WW-1242 ◆S-WW-1254	1-5/16" 1-5/16" 1-5/16" 1-5/16"	1/2"/13	2-3/4" 3-3/4" 4-1/4" 5-1/2" 7"	1/8" 1" 1-1/2" 2-3/4" 4-1/4"	2-1/4"	55
◆WS-5834* ◆WS-5842* ◆WS-5850* ◆WS-5860* ◆WS-5870* ◆WS-5884* ◆WS-58100	1-3/4" 2-1/2" 3-1/4" 3-1/2" 4-1/2" 1-3/4" 1-3/4"	◆WS-5834G* ◆WS-5860G*	1-3/4" 3-1/2"	◆WW-5834* ◆WW-5850* ◆WW-5860* ◆WW-5870* ◆WW-5884*	1-3/4" 3-1/4" 3-1/2" 4-1/2" 1-3/4"	◆S-WW-5850 ◆S-WW-5884	1-3/4" 1-3/4"	5/8"/11	3-1/2" 4-1/4" 5" 6" 7" 8-1/2" 10"	1/8" 7/8" 1-5/8" 2-5/8" 3-5/8" 5-1/8" 6-5/8"	2-3/4"	90
◆WS-3442* ◆WS-3446* ◆WS-3454* ◆WS-3462* ◆WS-3470* ◆WS-3484* ◆WS-34100 ◆WS-34120	1-3/4" 2-1/4" 3" 3-3/4" 4-1/2" 1-3/4" 1-3/4" 1-3/4"	◆WS-3446G* ◆WS-3454G* ◆WS-3484G	2-1/4" 3" 1-3/4"	◆WW-3446* ◆WW-3454* ◆WW-3470* ◆WW-3484* ◆WW-34100	2-1/4" 3" 4-1/2" 1-3/4" 1-3/4"	◆S-WW-3446 ◆S-WW-3454	1-3/4" 1-3/4"	3/4"/10	4-1/4" 4-3/4" 5-1/2" 6-1/4" 7" 8-1/2" 10" 12"	1/4" 3/4" 1-1/2" 2-1/4" 3" 4-1/2" 6" 8"	3-1/4"	175
WS-7860 WS-7880 WS-78100	2-1/2" 2-1/2" 2-1/2"			WW-7880	2-1/2"			7/8"/9	6" 8" 10"	1-3/8" 3-3/8" 5-3/8"	3-3/4"	250
†WS-10060 †WS-10090 †WS-100120	2-1/2" 2-1/2" 2-1/2"	†WS-10090G	2-1/2"	WW-10060 WW-10090	2-1/2" 2-1/2"			1"/8	6" 9" 12"	1/2" 3-1/2" 6-1/2"	4-1/2"	300
†WS-12590 †WS-125120	3-1/2" 3-1/2"							1-1/4"/7	9" 12"	2-1/4" 5-1/4"	5-1/2"	500
Tie Wire TWS-1400	N/A							1/4"	2-3/16"	Eye Dia. 9/32"	1-1/8"	N/A

*Fully Threaded

1 Performance data also available for concrete strengths from 2500 to 5500 PSI, and lightweight aggregate concrete from 4000 to 6000 PSI.

†Carbon steel anchor sizes through 7/8" in diameter have stainless steel expansion clips. Larger diameter carbon steel and galvanized anchors have carbon steel expansion clips. All size stainless steel anchors have stainless steel expansion clips. †Denotes carbon steel clip.

2 Ultimate load capacity in 4,000 PSI stone aggregate concrete. Ultimate pullout and shear loads are indicated for the depth of embedment in concrete shown in the "Embedment in Concrete" column. Based on independent Testing Laboratory tests.

1-1/4" diameter carbon steel anchors were tested at a depth of 10-1/2" for tensile capacities, and 10" for shear. 1" diameter stainless steel anchors were tested at a depth of 10-1/2" for tensile capacities, and 10-1/4" for shear. Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.

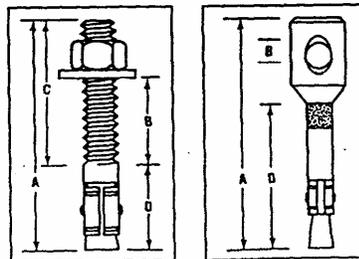
For load capacities in structural lightweight aggregate concrete, refer to ICBO Report #1372 or contact Technical Service Department.

For extreme low temperature applications, use stainless steel anchors.

NOTE: Capacities shown in Selection Chart are based on most recent testing performed in compliance with ASTM E-488 and ICBO Research Committee Standards for Testing Expansion Anchors in Concrete.

◆ Indicates Approval. ◆ Indicates Listing.

***WW* anchor body material may be Type 303 or Type 302HQ according to metal forming efficiency. Type 302HQ meets corrosion resistant properties of Type 303 and 304.



ITW RAMSET/RED HEAD ANCHORS - Example #3

ITW Ramset/Red Head



MADE
 IN
 U.S.A.

DYNABOLT SLEEVE

VERSATILE, HEAVY-DUTY SLEEVE ANCHOR

- Anchor diameter equals hole diameter.
- Available in hex head and 6 other head styles.
- Provides full 360° hole contact over large area and reduces concrete stress.
- Heavy-loading capacity.
- Preassembled for faster, easier installations.
- Dynabolt can be installed through object to be fastened.
- Six rib sleeve design improves holding power.
- No pre-spotting of holes necessary.

MODELS/VARIATIONS

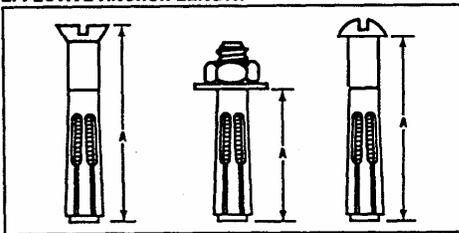
Carbon Steel—Sleeve anchors are available in sizes from 1/4" to 3/4", and in lengths from 1 3/8" to 6 1/4". Head styles available are acorn nut, hex nut, flat head, threshold flat head, round head, tie wire and hex coupling. Zinc plated in accordance with Fed. Spec. QQ-Z-325C Type II, Class 3.

Stainless Steel—for protection in humid or corrosive environments, stainless hex head, flat head and round head sleeve anchors are available.

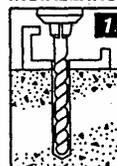
SELECTION CHART

Head Style	Carbon Steel	Stainless Steel	Anchor Diameter & Drill Bit Size	A Effective Anchor Length	Bolt Diameter/Threads Per Inch	Min. Embedment	Max. Thickness Of Material To Be Fastened	4000 PSI ¹	4000 PSI ¹
	Catalog Number	Catalog Number						Ultimate Pullout ² Lbs.	Ultimate Shear ² Lbs.
	HN-1405		1/4"	5/8"	3/16"/24	1/2"	1/8"	500	1751
	HN-1413	SHN-1413	1/4"	1-3/8"	3/16"/24	1-1/8"	1/4"	1613	1751
	HN-1422		1/4"	2-1/4"	3/16"/24	1-1/8"	1-1/8"	1613	1751
	HN-1614		5/16"	1-1/2"	1/4"/20	1-1/4"	1/4"	2429	2487
	HN-1624		5/16"	2-1/2"	1/4"/20	1-1/4"	1-1/4"	2429	2487
	HN-3817	SHN-3817	3/8"	1-7/8"	5/16"/18	1-1/2"	3/8"	2597	2872
	HN-3830	SHN-3830	3/8"	3"	5/16"/18	1-1/2"	1-1/2"	2597	2872
	◆HN-1222	◆SHN-1222	1/2"	2-1/4"	3/8"/16	1-7/8"	3/8"	5385	5582
	◆HN-1230		1/2"	3"	3/8"/16	1-7/8"	1-1/8"	5385	5582
	◆HN-1240	◆SHN-1240	1/2"	4"	3/8"/16	1-7/8"	2-1/8"	5385	5582
	◆HN-5822		5/8"	2-1/4"	1/2"/13	2"	1/4"	5708	7435
	◆HN-5830		5/8"	3"	1/2"/13	2"	1"	5708	7435
	◆HN-5842	◆SHN-5842	5/8"	4-1/4"	1/2"/13	2"	2-1/4"	5708	7435
	◆HN-5860		5/8"	6"	1/2"/13	2"	4"	5708	7435
	◆HN-3424		3/4"	2-1/2"	5/8"/11	2-1/4"	1/4"	6470	13071
	◆HN-3440		3/4"	4"	5/8"/11	2-1/4"	1-3/4"	6470	13071
	◆HN-3462		3/4"	6-1/4"	5/8"/11	2-1/4"	4"	6470	13071

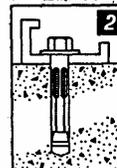
EFFECTIVE ANCHOR LENGTH



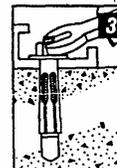
INSTALLATION STEPS



1. Use a bit whose diameter is 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.

See Installation Cautions on Back Page.

ITW RAMSET/RED HEAD ANCHORS - Example #4

ITW Ramset/Red Head



MADE
IN
U.S.A.

MULTI-SET II DROP-IN

**INTERNALLY THREADED, HEAVY-DUTY,
STEEL EXPANSION DROP-IN ANCHOR**

- Flange-topped, non-bottom bearing anchor.
- Fast, easy installation.
- Multi-Set II anchor can be installed flush or recessed in a hole of any depth.
- Four-way slot assures dependable, uniform anchor expansion.
- Pre-assembled plug cannot fall out in shipment, or during installation.

- Anchor body installs quickly and reduces concrete unit stress.
- Layout and hole-spotting necessary for accurate installation.

MODELS/VARIATIONS

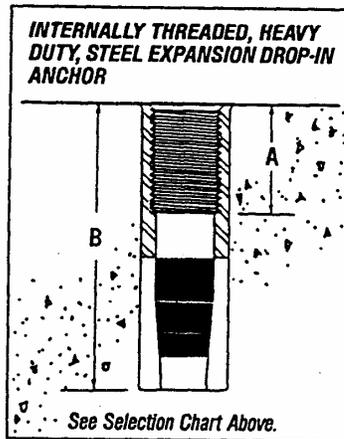
Carbon Steel—Multi-Set II Anchors are available in sizes 1/4" through 3/4". Zinc plated in accordance with Fed. Spec. QQ-Z-325C Type II, Class 3.

Stainless Steel—for protection in humid or corrosive environments, available in sizes 1/4" through 5/8".

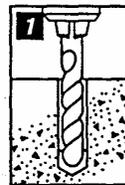
SELECTION CHART

Carbon Steel Cat. No.	303 Stainless Steel Cat. No.	Bolt Size/Threads Per Inch	Drill Bit Size	A Thread Depth	B Min. Hole Depth	Ultimate Pullout* Lbs.	Ultimate Shear* Lbs.	Setting Tool Cat. No. 2
RM-14	SRM-14	1/4"/20	3/8"	3/8"	1"	3,204	1,986	RT-114
♦RM-38	♦SRM-38	3/8"/16	1/2"	1/2"	1-5/8"	6,350	3,968	RT-138
♦RM-12	♦SRM-12	1/2"/13	5/8"	3/4"	2"	8,544	6,502	RT-112
♦RM-58	♦SRM-58	5/8"/11	7/8"	1"	2-1/2"	15,218	10,380	RT-158
♦RM-34		3/4"/10	1"	1-1/4"	3-3/16"	17,255	13,962	RT-134

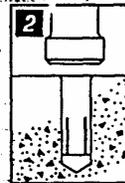
¹Performance data also available for lightweight aggregate concrete from 4000 to 6000 PSI.
²Use only Ramset/Red Head setting tools to insure proper installation.
³Ultimate load capacity in 4310 PSI 3/4 inch crushed limestone aggregate concrete. Capacities are for carbon steel versions. Based on independent Testing Laboratory tests. Copies of reports are available on request.
For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept.
Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.
♦ Indicates Approval. • Indicates Listing.
For additional Approvals/Listings see Selector Guide (page 2).



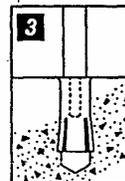
INSTALLATION STEPS



To set anchor flush with surface.
1. Drill hole the same diameter as anchor being used to any depth exceeding minimum embedment. Clean hole.



2. Drive anchor flush with surface of concrete.



3. Expand anchor with setting tool provided. Anchor is properly expanded when shoulder of setting tool is flush with top of anchor.

To set anchor below surface.
1a. 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.

See Installation Cautions on Back Page.

ITW RAMSET/RED HEAD ANCHORS - Example #5



ITW Ramset/Red Head

SELF-DRILL

MADE
IN
U.S.A.



HEAVY-DUTY ANCHOR THAT DRILLS ITS OWN HOLE

- Anchor expands by driving anchor over the plug.
- Hole diameter and depth are assured.
- Dependable, powerful holding capacity.
- Self-drilling action produces accurate hole size, every time.
- Fast, easy installation.
- Eliminates use of carbide bits by drilling its own hole.
- Perfect for dependable overhead applications.

MODELS

Self-drilling anchors are available in snap-off design, sizes 1/4" through 3/4" for floor, wall and ceiling installation with rotary/stop hammer. Zinc plated in accordance with Fed. Spec. QQ-Z-325C Type II, Class 3. Meets or exceeds U.S. Government G.S.A. Specification FF-S-325 Group III, Type 1.

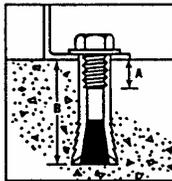
VARIATIONS

Self-drilling anchors are available with oversize internal threads to accept galvanized bolts. (Special order.)

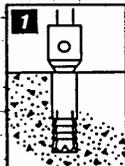
SELECTION CHART

Cat. No.	Bolt Size/Threads Per Inch	A Thread Depth	B Depth in Concrete	Outside Dia.	Ultimate ¹ Pullout * Lbs.	Ultimate ¹ Shear * Lbs.
S-14	1/4"/20	3/8"	1-3/32"	7/16"	2,713	2,103
◆S-38	3/8"/16	9/16"	1-17/32"	9/16"	4,200	4,550
◆S-12	1/2"/13	13/16"	2-1/32"	11/16"	7,350	6,800
◆S-58	5/8"/11	15/16"	2-15/32"	27/32"	10,250	9,900
◆S-34	3/4"/10	1-7/32"	3-1/4"	1"	13,950	12,350

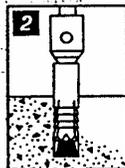
¹Performance data also available for concrete strengths from 2000 to 4000 PSI, and lightweight aggregate concrete from 4000 to 6000 PSI.
*Ultimate load capacity in 4713 PSI 3/4 inch crushed limestone aggregate concrete. Based on independent Testing Laboratory tests.
For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept.
Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.
◆ Indicates Approval. • Indicates Listing.
For additional Approvals/Listings see Selector Guide (page 2).



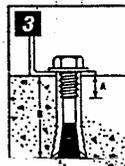
INSTALLATION STEPS



1. Using the anchor as the drill bit, drill hole until chuck holder is flush with surface of concrete. Remove anchor from hole and clean out anchor and hole.



2. Insert red plug in anchor. Expand anchor by reinserting it into hole and driving it in until chuck holder is flush with the surface of the concrete. Snap off cone.



3. Bolt the object to complete the installation.

See Installation Callouts on Back Page.

CHUCK SHANKS (with Drift Pins)

Catalog Number	Chuck Used	Shank Type
SS-47	RH Chuck Head	Spline

SELF-DRILL CHUCK HEADS

Catalog Number	Shank Used Spline	Anchor Size
RH-514	SS-47	1/4"
RH-538	SS-47	3/8"
RH-512	SS-47	1/2"
RH-558	SS-47	5/8"
RH-534	SS-47	3/4"

ITW RAMSET/RED HEAD ANCHORS - Example #6



MADE
IN
U.S.A.

ITW Ramset/Red Head

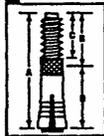


STUD ANCHOR

BOTTOM BEARING, EXTERNAL THREAD EXPANSION ANCHOR

- Fast and easy to install.
- Drill bit size equals anchor diameter.
- Hammer-driven for dependable load capacity.
- Anchor can be installed through object to be fastened, no hole spotting is necessary.
- Each Stud Anchor is pre-assembled.
- Bottom-bearing design is ideal for jacking and leveling.

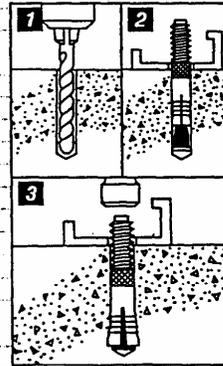
Catalog Number	Hole & Drill Bit Size/Threads Per Inch	A Overall Length	B Stud Length	C Thread Length	D Min. Embedment	Ultimate ¹ Pullout* (Lbs.)	Ultimate ¹ Shear** (Lbs.)
JS-14C	1/4"/20	1-3/4"	3/4"	5/8"	1-3/8"	1,909	2,186
JS-14H		2-1/4"	1-1/8"	7/8"			
JS-14M		3-1/4"	2-1/8"	7/8"			
◆ JS-38C		2-1/4"	1"	3/4"			
◆ JS-38H	3/8"/16	3"	1-5/8"	1-1/4"	1-5/8"	2,327	4,575
◆ JS-38M		3-3/4"	2-1/4"	1-1/4"			
◆ JS-12C		2-3/4"	1-1/8"	7/8"			
◆ JS-12H	1/2"/13	4-1/4"	2-1/2"	2"	1-7/8"	5,826	6,524
◆ JS-12M		5-1/4"	3-5/8"	2"			
◆ JS-58C		3-3/8"	1-3/8"	1"			
◆ JS-58H	5/8"/11	5"	3"	2-1/4"	2-3/8"	7,705	11,199
◆ JS-58M		7"	5"	2-1/4"			
◆ JS-34C		4-1/4"	1-3/4"	1-3/8"			
◆ JS-34H	3/4"/10	6-1/4"	3-3/4"	2-1/2"	2-7/8"	9,597	15,276
◆ JS-34M		8-1/2"	6"	2-1/2"			



¹Performance data also available for concrete strengths from 2000 to 4000 PSI, and lightweight aggregate concrete from 4000 to 6000 PSI.
²Ultimate load capacity in 4090 PSI 3/4 inch crushed limestone aggregate concrete. Based on independent Testing Laboratory tests. For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept. Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.

◆ indicates Approval. ◆ indicates Listing.
 For additional Approvals/Listings see Selector Guide (page 2).

INSTALLATION STEPS



1. Drill hole same diameter as anchor to embedment specified in chart. Clean hole.
2. Drive anchor with red plug in bottom, through material to be fastened.
3. Expand anchor by driving anchor over plug with hammer.

See Installation Cautions on Back Page.

NON-DRILL

MADE
IN
U.S.A.

HEAVY-DUTY, INTERNAL THREAD EXPANSION ANCHOR

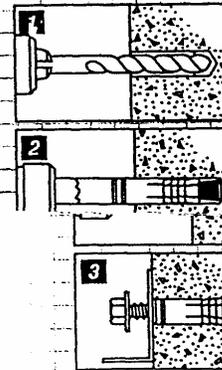
- Anchor expands by driving the anchor over the plug.
- Vibration and shock resistant.
- Perfect for flush installations.
- Bottom-bearing design for immediate loading.
- Anchor is hammer-driven.

Cat. No.	Bolt Size/Threads Per Inch	Anchor Diameter (Drill Size)	Thread Depth	Min. Hole Depth	Ultimate ¹ Pullout* (Lbs.)	Ultimate ¹ Shear** (Lbs.)	Setting Tool Cat. No.
J-14	1/4"/20	7/16"	3/8"	1-1/8"	2,380	10,114	JD-38
◆ J-38	3/8"/16	9/16"	15/32"	1-9/16"	3,978	7,373	JD-12
◆ J-12	1/2"/13	11/16"	23/32"	2-1/16"	7,549	8,863	JD-58
◆ J-58	5/8"/11	27/32"	7/8"	2-9/16"	10,847	13,618	JD-34
◆ J-34	3/4"/10	1"	1-1/8"	3-3/16"	12,260	18,282	

¹Performance data also available for concrete strengths from 2000 to 4000 PSI.
²Ultimate load capacity in 4090 PSI 3/4 inch crushed limestone aggregate concrete. Based on independent Testing Laboratory tests. For load capacities in structural lightweight aggregate concrete refer to ICBO Report No. 1372 or contact Technical Service Dept. Safe working loads for single installations under static loading should not exceed 25% of the ultimate load capacity. For information on other conditions, contact your nearest factory representative.

**Shear tests were conducted in 3802 PSI concrete.
 ◆ indicates Approval. ◆ indicates Listing.

INSTALLATION STEPS



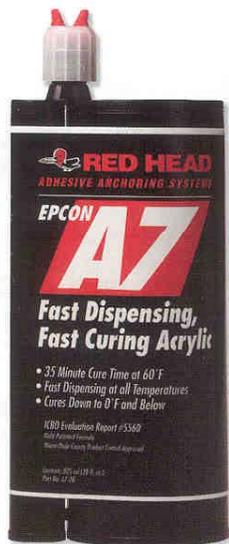
1. Drill hole to anchor diameter and embedment specified in the chart. Clean hole.
2. Place red plug snug in anchor. Drop in hole and expand anchor with a few blows of hammer on setting tool until flush or slightly below flush with the surface.
3. Insert bolt and secure item being installed.

See Installation Cautions on Back Page.

ITW RAMSET/RED HEAD ANCHORS – Example #7



**Easy to Use—
A7 Saves You
Time and Money**



A7-28



A102



DESCRIPTION/SUGGESTED SPECIFICATIONS*

*Suggested Specifications see pages 24-25

Fast Dispensing, Fast Curing Acrylic Adhesive

The acrylic resin and hardening agent are completely mixed as they are simultaneously dispensed from the dual cartridge through a static mixing nozzle, directly into the anchor hole. A7 can be used with threaded rod or rebar (for fastening to hollow base materials, see page 46 and 49).



**How Can
An Adhesive
Anchor Save
You Money?**

- Incredibly fast dispensing and rod installation times
- Significantly faster curing times
- Easy to use (no-heating) even at freezing cold temperatures
- Requires less adhesive

ADVANTAGES

- All weather formula, down to 0°F and below
- No drip, no sag, easy clean up
- Fast & easy dispensing, even 28 ounce cartridge can be hand dispensed
- Fast curing time, 35 minutes at 60°F
- Not mix ratio sensitive
- Rods are easier to insert into the hole with A7 compared with other adhesives
- Works in damp holes and underwater applications
- Requires less adhesive—can be used in 1/16" oversized or 1/8" oversized holes
- One formula for both hollow and solid base materials

Curing Times and Dispensing Speeds

TEMPERATURE (°F/°C)	WORKING TIME	FULL CURE TIME
100° / 38°	5 minutes	25 minutes
80° / 27°	5.5 minutes	30 minutes
60° / 16°	7 minutes	35 minutes
40° / 4°	15 minutes	75 minutes
20° / -7°	35 minutes	6 hours
0° / -18°	4 hours	24 hours

¹ Dispensing rates for A7-28 cartridge using A200 pneumatic tool.
Cartridge temperature = temperature shown

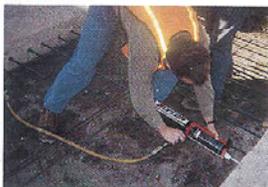
ITW RAMSET/RED HEAD ANCHORS – Example #7, page2

A7

APPLICATIONS



Stadium Seating
 The fast dispensing, fast curing properties of A7 made it ideal for installing over 70,000 seats in this NFL football stadium and many others.



Roadway Doweling
 A7 dispenses so quickly and rebar inserts so easily that contractors find installed costs are lower than many other products including grout for doweling.



Scaffolding Attachment
 Fast curing adhesive in 28 ounce cartridges kept this project moving upwards without delays.

FEATURES



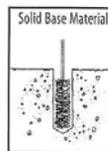
ANCHORAGE TO SOLID CONCRETE

- Threaded Rod (Carbon or Stainless Steel) or Rebar supplied by contractor; rod does not need to be chisel pointed
- A7 adhesive completely fills area between rod and hole creating a stress free, high load anchorage
- Pre-drilled hole in concrete; see performance tables for suggested hole sizes

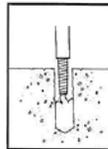
APPROVALS/LISTINGS

ASTM Type IV, Grade 3, Class A, B, C (exceptions - A7 gels faster than ASTM requirements and does not contain any epoxy)
 ICBO Evaluation Service, Inc. – #ER-5560
 Metro-Dade County – #01-0501.01
 City of Los Angeles – RR#25379
 DOT Approvals (see page T1)

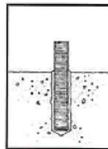
INSTALLATION STEPS



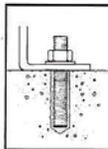
1. Drill proper sized hole. Clean out hole from bottom with forced air. Complete hole preparation with use of a brush and repeat cleaning with forced air (leave no dust or slurry).



2. When starting new cartridge or nozzle, dispense and discard enough adhesive until uniform dark grey color is achieved. Insert the nozzle into the bottom of the hole and fill to 1/2 the hole depth.



3. Insert the selected rod slowly by hand into the bottom of the hole with a slow twisting motion. This insures the adhesive fills voids and crevices uniformly.

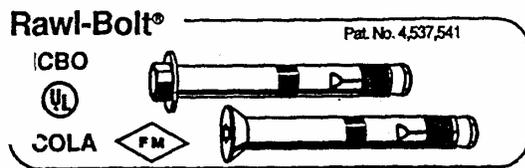


4. See A7 Cure Time Charts for set-up time. After the recommended cure time is met, install and tighten fixture into place.



**A101
 Dispenser**

THE RAWL COMPANY, INC. - Example #1



Use In: Concrete, block, brick, stone
Use with: No other fastener needed
Made of: Carbon steel, zinc plated (ASTM B-633), or Type 304 stainless steel (passivated)

Size range: 1/4" x 1-3/4" to 3/4" x 8-1/4"

- Finished hex head design or flat head
- Heavy loading capacity
- Vibration-resistant expansion cone
- Dual-level anchor loading and undercut expansion
- One piece assembly
- No layout or hole spotting required
- 5 diameters, 34 lengths
- ICBO Report No. 4514, FM Approved, UL listed, COLA
- Removable

Remove inspection tag. Do not expand before installation. Position fixture, drill hole. Insert Rawl-Bolt and drive flush with fixture. Tighten to recommended torque.

The Rawl-Bolt is a single-unit, vibration-resistant, removable anchor bolt assembly with a finished hex or flat head design. As the anchor size is hole size, the Rawl-Bolt eliminates layout or hole-spotting. As the anchor is driven into the hole, the slotted, over-sized annular ring on the bottom of the cone is compressed until it mates perfectly with the hole. This action prevents the anchor from spinning while it is being tightened.

Expansion occurs at two levels within the drilled hole. First, the cone is pulled into the large triple-lined expansion sleeve, developing a mid-level, load bearing capacity over a large surface area. Further turning causes the threaded bolt to advance into the threads at the compressed end of the cone, forcing the four sections of the cone outward, driving them into the base material. This action develops a lower level undercut load-bearing capacity deep in the hole over a the full 360° area, greatly increasing the holding power of the anchor and reducing the tendency of the concrete to spall under heavy loading.

As the bolt enters the compressed threaded area of the cone, tremendous lateral forces are created between the concrete and the mating male and female threads, which keeps them locked together preventing loosening under even the most severe vibratory conditions.

The Rawl-Bolt is designed to draw the work tighter to the surface because of its unique, flexible, compression ring. As the anchor is being tightened, the nylon compression ring will compress so that the material being fastened is tightly pressed against the face of the base material.

STAINLESS STEEL HEX HEAD RAWL-BOLT®

Stainless steel Rawl-Bolt Anchors are manufactured from Type 304 stainless steel.

Cat. No.	Size	Drill Dia.	Min. Depth	Std. Box	Std. Ctn.	Wt./ 100
5910	3/8" x 2-1/4"	3/8"	2"	50	300	10
5914	3/8" x 3-1/2"	3/8"	2"	50	300	12
5916	3/8" x 4"	3/8"	2"	50	300	14
5930	1/2" x 2-3/4"	1/2"	2-1/2"	50	200	16
5934	1/2" x 4-3/4"	1/2"	2-1/2"	25	150	26
5944	5/8" x 5"	5/8"	2-3/4"	15	90	47
5946	5/8" x 7"	5/8"	2-3/4"	15	60	67
5954	3/4" x 5-1/4"	3/4"	3"	15	60	70
5957	3/4" x 8-1/4"	3/4"	3"	10	40	110

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

CARBON STEEL FLAT HEAD RAWL-BOLT®

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

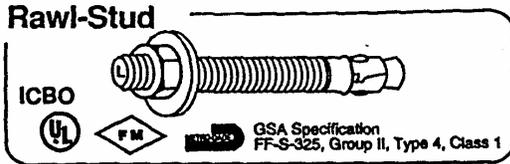
6981	3/8" x 4"	3/8"	2"	50	300	14
6982	3/8" x 5"	3/8"	2"	50	300	17
6983	3/8" x 6"	3/8"	2"	50	300	20
6984	1/2" x 4-3/4"	1/2"	2-1/2"	25	150	26
6987	5/8" x 6"	5/8"	2-3/4"	15	90	57

FIXTURE CLEARANCE HOLES

Since the Rawl-Bolt Anchor is designed to be driven through the fixture, the following table lists the minimum recommended clearance hole to be provided in the fixture. The clearance hole should be adjusted to allow for any coating applied to the fixture

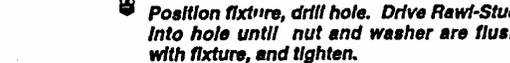
Anchor Size	1/4"	3/8"	1/2"	5/8"	3/4"
Clearance Hole	5/16"	7/16"	9/16"	11/16"	13/16"

THE RAWL COMPANY, INC. - Example #2



Use In: Concrete, stone
Use with: No other fastener needed
Made of: Carbon steel or stainless steel
Size range: 1/4" x 1-3/4" to 1-1/4" x 12"

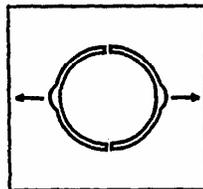
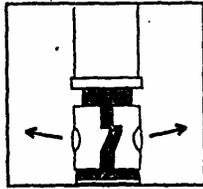
- No layout or hole spotting required
- Patented inter-locking wedges
- FM approved, UL listed, ICBO Report No. 4514, Metro-Dade
- 89 diameters and lengths, other sizes on special order
- Also stocked in mechanically galvanized carbon steel, types 303 and 316 stainless steel



Position fixture, drill hole. Drive Rawl-Stud into hole until nut and washer are flush with fixture, and tighten.

The Rawl-Stud is a one-piece anchor available in carbon steel or stainless steel for installation in highly corrosive environments.

The patented dual inter-locking expansion wedges provide optimum performance. During installation of the Rawl-Stud, the inter-locking tabs on the wedges grip the anchor body firmly to prevent spinning of the anchor during the tightening process. As the anchor is tightened, the wedges distribute the compression load equally in lateral planes to prevent cocking of the anchor or premature failure of the concrete due to uneven distribution of the load.



The Rawl-Stud is available with a length identification mark stamped on the head of the anchor as shown below.

Mark	A	B	C	D	E	F	G	H
From	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
Up to But Not Including	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2

Mark	I	J	K	L	M	N	O	P
From	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9
Up to But Not Including	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2

Mark	Q	R	S	T	U	V	W	X	Y	Z
From	9 1/2	10	11	12	13	14	15	16	17	18
Up to But Not Including	10	11	12	13	14	15	16	17	18	19

STAINLESS STEEL RAWL-STUD

Stainless Steel Rawl-Stud anchors are manufactured from AISI Type 303 and Type 316 steel (passivated). Additional sizes and corrosion resistant materials are available on a special order basis.

TYPE 303 STAINLESS STEEL RAWL-STUD

Cat. No.	Size	Min. Depth	Thread Length	Std. Box	Std. Ctn.	Wt./100
7300	1/4" x 1-3/4"	1-1/8"	3/4"	100	500	3
7302	1/4" x 2-1/4"	1-1/8"	1-1/4"	100	500	3-1/2
7304	1/4" x 3"	1-1/8"	2"	100	500	4-3/4
7310	3/8" x 2-1/4"	1-3/4"	1"	50	250	8-3/4
7312	3/8" x 2-3/4"	1-3/4"	1-1/2"	50	250	9-1/2
7313	3/8" x 3"	1-3/4"	2-1/4"	50	250	10-3/4
7314	3/8" x 3-1/2"	1-3/4"	2-1/4"	50	250	12
7315	3/8" x 3-3/4"	1-3/4"	2-1/2"	50	250	12-3/4
7316	3/8" x 5"	1-3/4"	3-3/4"	50	250	15-1/2
7320	1/2" x 2-3/4"	2-1/4"	1-1/4"	50	200	18
7322	1/2" x 3-3/4"	2-1/4"	2-1/4"	50	200	23
7323	1/2" x 4-1/2"	2-1/4"	3"	50	200	30
7324	1/2" x 5-1/2"	2-1/4"	4"	50	150	34
7326	1/2" x 7"	2-1/4"	5-1/2"	25	100	44
7330	5/8" x 3-1/2"	2-7/8"	1-7/8"	25	100	40
7332	5/8" x 4-1/2"	2-7/8"	2-7/8"	25	100	54
7333	5/8" x 5"	2-7/8"	3-3/8"	25	100	57
7334	5/8" x 6"	2-7/8"	4-3/8"	25	25	64
7336	5/8" x 7"	2-7/8"	5-3/8"	25	25	72
7338	5/8" x 8-1/2"	2-7/8"	1-5/8"	25	25	84
7340	3/4" x 4-1/4"	3-3/8"	2-1/4"	20	20	70
7341	3/4" x 4-3/4"	3-3/8"	2-3/4"	20	20	76
7342	3/4" x 5-1/2"	3-3/8"	3-1/2"	20	20	85
7344	3/4" x 6-1/4"	3-3/8"	4-1/4"	20	20	95
7346	3/4" x 7"	3-3/8"	1-3/4"	20	20	105
7348	3/4" x 8-1/2"	3-3/8"	1-3/4"	10	10	120
7349	3/4" x 10"	3-3/8"	1-3/4"	10	10	135
7361	1" x 6"	4-1/2"	2-3/8"	10	10	170
7363	1" x 9"	4-1/2"	2-3/8"	10	10	240
7365	1" x 12"	4-1/2"	2-3/8"	10	10	300

TYPE 316 STAINLESS STEEL RAWL-STUD

7610	3/8" x 2-1/4"	1-3/4"	1"	50	250	8-3/4
7612	3/8" x 2-3/4"	1-3/4"	1-1/2"	50	250	10-1/2
7614	3/8" x 3-1/2"	1-3/4"	2-1/4"	50	250	12-1/2
7615	3/8" x 3-3/4"	1-3/4"	2-1/2"	50	250	13
7616	3/8" x 5"	1-3/4"	3-3/4"	50	250	17-1/4
7620	1/2" x 2-3/4"	2-1/4"	1-1/4"	50	200	18
7622	1/2" x 3-3/4"	2-1/4"	2-1/4"	50	200	24
7624	1/2" x 5-1/2"	2-1/4"	4"	50	150	34
7626	1/2" x 7"	2-1/4"	5-1/2"	25	100	44
7630	5/8" x 3-1/2"	2-7/8"	1-7/8"	25	100	40
7632	5/8" x 4-1/2"	2-7/8"	2-7/8"	25	100	54
7634	5/8" x 6"	2-7/8"	4-3/8"	25	25	64
7638	5/8" x 8-1/2"	2-7/8"	6-7/8"	25	25	84
7640	3/4" x 4-1/4"	3-3/8"	2-1/4"	20	20	70
7642	3/4" x 5-1/2"	3-3/8"	3-1/2"	20	20	85
7646	3/4" x 7"	3-3/8"	5"	20	20	105
7648	3/4" x 8-1/2"	3-3/8"	1-3/4"	10	10	120

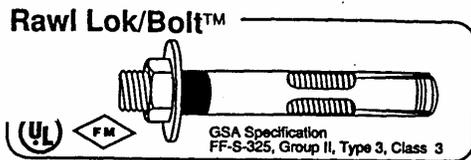
The published length is the overall length of the anchor. Allow one anchor diameter for the nut and washer thickness when selecting a length.

FIXTURE CLEARANCE HOLES FOR RAWL-STUD

For installations where the Rawl-Stud will be driven through the fixture, the following table lists the minimum recommended clearance hole to be provided in the fixture. The clearance holes should be adjusted to allow for any coating applied to the fixture

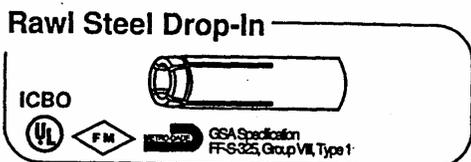
Anchor Size	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1-1/4"
Clearance Hole	5/16"	7/16"	9/16"	11/16"	13/16"	15/16"	1-1/8"	1-3/8"

THE RAWL COMPANY, INC. - Example #3



Rawl Lok/Bolt™
 GSA Specification FF-S-325, Group II, Type 3, Class 3
 Use In: Concrete, block, brick, stone
 Use with: No other fastener needed
 Made of: Steel, zinc plated (ASTM B-633)
 Size range: 1/4" x 5/8" to 3/4" x 7-1/2"
 • No layout or hole spotting required
 • 5 head styles, 6 diameters, 45 lengths
 • Extenders for extra length
 • FM Approved, UL listed
 • One-piece assembly
 Position fixture, drill hole. Insert Lok/Bolt, tap flush with fixture, and tighten.

The Rawl Lok/Bolt is designed to draw the fixture tighter to the surface because of its unique, flexible, compression ring. As the anchor is being tightened, the nylon compression ring will compress, if necessary, so that the material being fastened is tightly secured against the face of the base material. Under load, the specially tapered bolt is drawn further into the expansion sleeve to develop increased locking action against the walls of the hole.
 The all-steel, multi-purpose anchor bolt is intended for use in a wide range of concrete and masonry materials. Installation is fast and easy. Drill a hole of the same diameter as the Lok/Bolt, with fixture in place. Insert the Lok/Bolt, tap hole until flush with fixture and tighten with wrench or screwdriver to the recommended torque.



Rawl Steel Drop-In
 GSA Specification FF-S-325, Group VII, Type 1
 Use In: Concrete, stone
 Use with: Machine screw, bolt, or threaded rod
 Made of: Steel, zinc plated (ASTM B-633)
 Type 303 stainless steel, (passivated)
 Size range: 1/4" through 3/4"
 • Layout or hole spotting required
 • Internal plug, pre-assembled
 • Smooth anchor body
 • FM approved, UL listed, ICBO Report No. 4514, Metro-Dade
 • Screw engagement minimum of 2/3 of anchor threads
 Drill required hole. Insert anchor and tap flush with surface. Using setting tool (provided free with 100 anchors), set the Drop-In with several sharp hammer blows. Position the fixture, insert screw or bolt and tighten.

The Rawl Steel Drop-In is an all-steel, machine bolt anchor with a pre-assembled internal expander plug. This anchor design offers fast and easy installation and provides maximum holding power. It can be installed flush with the base material surface or set in.

Cat. No.	Size	Drill Dia.	Min. Depth	Std. Box	Std. Ctn.	Wt./100
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HEX NUT

5005	5/16" x 1-1/2"	5/16"	1-3/8"	100	1000	4-1/4
5010	5/16" x 2-1/2"	5/16"	1-1/2"	100	500	5-3/4
5015	3/8" x 1-7/8"	3/8"	1-5/8"	50	500	7
5020	3/8" x 3"	3/8"	1-5/8"	50	250	10
5022	3/8" x 4"	3/8"	1-5/8"	50	250	16
5025	1/2" x 2-1/4"	1/2"	2-1/8"	25	250	14
5030	1/2" x 3"	1/2"	2-1/4"	25	250	17-1/4
5034	1/2" x 4"	1/4"	2-1/4"	25	125	22
5033	1/2" x 5-1/4"	1/2"	2-1/4"	25	125	27
5032	1/2" x 6"	1/2"	2-1/4"	25	125	35
5035	5/8" x 2-1/4"	5/8"	2-1/8"	25	125	25-1/2
5038	5/8" x 3"	5/8"	2-3/4"	25	125	34
5040	5/8" x 4-1/4"	5/8"	2-3/4"	10	100	41
5045	5/8" x 6"	5/8"	2-3/4"	10	100	49
5050	3/4" x 2-1/2"	3/4"	2-1/8"	10	100	46
5055	3/4" x 4"	3/4"	3-3/8"	10	10	70
5060	3/4" x 5-3/4"	3/4"	3-3/8"	10	10	90
5065	3/4" x 7-1/2"	3/4"	3-3/8"	10	10	115

MULTIPLE USE KIT

5660	1/2"	1/2"	2-1/4"	25	250	10
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The published length is measured from below the washer to the end of the anchor.

STEEL DROP-IN (INTERNAL PLUG)

Cat. No.	Size	Drill Dia.	Min. Depth	Thread Depth	Std. Box	Std. Ctn.	Wt./100
6304	1/4"	3/8"	1-1/4"	7/16"	100	1000	2
6306	3/8"	1/2"	1-7/8"	5/8"	50	500	6
6308	1/2"	5/8"	2-3/8"	13/16"	50	250	12
6320	5/8"	7/8"	3"	1-3/16"	25	125	32
6312	3/4"	1"	3-1/2"	1-3/8"	10	50	48

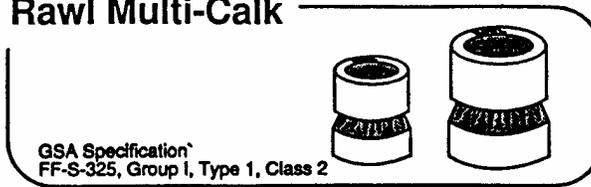
STAINLESS STEEL DROP-IN (INTERNAL PLUG)

6204	1/4"	3/8"	1-1/4"	7/16"	100	1000	2
6206	3/8"	1/2"	1-7/8"	5/8"	50	500	6
6208	1/2"	5/8"	2-3/8"	13/16"	50	250	12
6220	5/8"	7/8"	3"	1-3/16"	25	125	32
6212	3/4"	1"	3-1/2"	1-3/8"	10	50	48

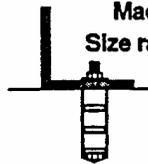
One setting tool included with 100 anchors.

THE RAWL COMPANY, INC. - Example #4

Rawl Multi-Calk

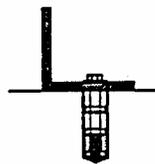


Use In: Concrete, brick, stone
Use with: Machine screw or bolt
Made of: Lead and Zamac 7 alloy
Size range: 1/2" to 1"



- Layout or hole-spotting required
- Heavy Duty
- Threaded and plain style
- Screw engagement minimum of 2/3 of anchor threads

Stud Installation - Place bolt head in hole. Drop plain unit (cone end first) over bolt. Calk with tool until firmly set. Repeat for each successive unit. Position fixture. Thread on nut and tighten.



Threaded installation - Assemble threaded unit onto threaded rod. Insert assembly into hole, cone end first. Calk with tool until firmly set. Add additional plain unit(s), calking each individually. Remove rod. Position fixture. Insert screw or bolt and tighten.

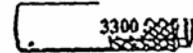
The Rawl Multi-Calk is a multiple-unit machine bolt anchor designed for the heavy duty loads.

Cat. No. Plain	Size	Drill Dia.	Std. Box	Std. Ctn.	Wt./ 100
9120	1/2"	1"	50	250	10
9125	5/8"	1-1/8"	50	250	14
9130	3/4"	1-3/8"	25	125	22
9135	7/8"	1-1/2"	25	25	32
9140	1"	1-5/8"	25	25	37

Cat. No. Thread	Size	Drill Dia.	Std. Box	Std. Ctn.	Wt./ 100
9170	1/2"	1"	50	250	15
9175	5/8"	1-1/8"	50	250	20
9180	3/4"	1-3/8"	25	125	35
9185	7/8"	1-1/2"	25	25	44
9190	1"	1-5/8"	25	25	54

STAR EXPANSION COMPANY - Example #1

DROP-GRIP® ANCHOR



Specifications:

Drop-Grip® Size	Drop-Grip® Length	Drill Bit Diameter	Drop-Grip® Thread Length	Bolt Diameter	Pullout Test in 4,000 P.S.I. CONCRETE Tensile
1/4"	1"	3/8"	7/16"	1/4"	2,300 lbs
3/8"	1-9/16"	1/2"	5/8"	3/8"	4,100 lbs
1/2"	2"	5/8"	1-3/16"	1/2"	6,000 lbs
5/8"	2-1/2"	7/8"	1-3/16"	5/8"	8,300 lbs
3/4"	3-3/16"	1"	1-3/16"	3/4"	13,600 lbs

Suggested safe working load is one-fourth (1/4) of the average proof test load.

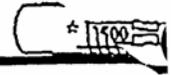
Note: All weight and load conditions described or referenced in this material were determined under laboratory conditions. Material and installation conditions vary in the field. To determine your holding factors, test product in actual conditions and material.

1. Drill hole to a depth at least equal to the length of the anchor.
2. Clean out hole of all dust and cuttings.
3. Insert anchor, knurled end first, and tap flush with surface.
4. Using a STAR Drop-In Setting Tool, set anchor with several solid hammer blows.
5. Position fixture over hole. Insert screw or bolt through fixture and tighten.



STAR EXPANSION COMPANY - Example #2

STEEL ANCHORS



Specifications:

Steel Anchor Size	Steel Anchor Length	Steel Anchor Thread Depth	Drill Bit Diameter	Bolt Diameter	Pullout Test in 4000 P.S.I. concrete	
					Tensile	Shear
1/4"	1-3/32"	3/8"	7/16"	1/4"	2,080 lbs	1,960 lbs
3/8"	1-17/32"	9/16"	9/16"	3/8"	2,560 lbs	4,400 lbs
1/2"	2-1/32"	13/16"	11/16"	1/2"	4,440 lbs	6,400 lbs
5/8"	2-15/32"	15/16"	27/32"	5/8"	6,280 lbs	9,720 lbs
3/4"	3-1/2"	1-7/32"	1"	3/4"	9,640 lbs	17,680 lbs

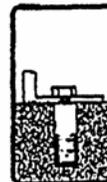
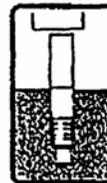
Suggested Safe Working Loads: 1/4 of the average maximum proof test load.

Note: All weights and load conditions described or referenced in this material were determined under laboratory conditions. Material and installation conditions vary in the field. To determine your holding factors, test product in actual conditions and materials.

Installation:

The Star Steel Anchor can be set flush or at varying depths for additional holding power. If set flush, an installation tool is not needed. Anchor can be set by applying hammer blows directly to the shield. The shield is expanded and anchored in place without the assistance of the object to be fastened. Objects bolted to this anchorage can be removed and/or replaced.

1. Drill hole of recommended diameter and depth into the concrete.
2. Clean out hole of all dust and cuttings.
3. Preassemble the expander plug, small end first, into the bore of the slotted end of the anchor. Tap lightly on the plug to ensure that it will not fall out of the anchor when putting it in the hole.
4. Place the Steel Anchor, expander plug first, into the hole.
5. Put the tapered end of the Setting Tool into the anchor and push down firmly against this. Using a heavy hand hammer, strike the Setting Tool with repeated sharp blows.
6. The anchor is completely set when it has fully expanded over the plug and set down tightly in the hole.
7. Position the object to be fastened over the anchor and bolt into place.



STAR EXPANSION COMPANY - Example #3

WEDGE-GRIP ANCHOR



Specifications:

Wedge-Grip Size	Wedge-Grip Thread Length	Minimum Embedment	Drill Bit Diameter	Pull Out Test in 4000 P.S.I. Concrete		
				Tensile	Shear	
1/4"	3/4"	1-1/8"	1/4"	1,640 lbs	1,200 lbs	10
3/8"	7/8" or 1-1/8"	1-5/8"	3/8"	3,040 lbs	4,300 lbs	15
1/2"	1-1/8 or 1-1/4"	2-1/4"	1/2"	4,300 lbs	6,240 lbs	20
5/8"	1-1/2"	2-3/4"	5/8"	6,020 lbs	9,060 lbs	25
3/4"	1-3/4"	3-1/4"	3/4"	8,620 lbs	13,100 lbs	40
7/8"	1-3/4"	4"	7/8"	12,000 lbs	19,200 lbs	50
1"	2-1/4"	4-1/2"	1"	17,000 lbs	25,200 lbs	

Suggested Safe Working Load: 1/4 of the average maximum proof test load.

* TORQUE FT-LB.

Note: All weight and load conditions described or referenced in this material were determined under laboratory conditions. Material and installation conditions vary in the field. To determine your holding factors, test product in actual conditions and material.

* REFERENCED FROM ICBO REPORT NOS. 2876 + 3304 FOR ISO BOLT + ZINS WEDGE TYPE STUD BOLT ANCHORS

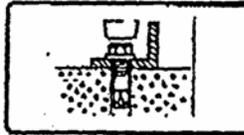
Installation:

The STAR Wedge-Grip Anchor requires no maximum hole depth. The depth of the hole in the concrete should be the length of the stud bolt minus the thickness of the material being fastened. This will result in some extra depth to accommodate a minor amount of concrete cuttings which you might not be able to clean out of the hole.

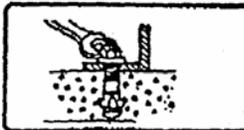
1. Drill hole into the concrete with a STAR carbide tipped masonry drill the same size as the Wedge-Grip Anchor. If the fixture being fastened is in place and being used as a template to locate the Wedge-Grip Anchor, the mounting hole in the fixture should afford clearance for the wedge clip on the stud.



2. Place the Wedge-Grip Anchor through the hole in the fixture and hammer drive it into the hole drilled in the concrete until the washer becomes flush with the surface of the fixture.



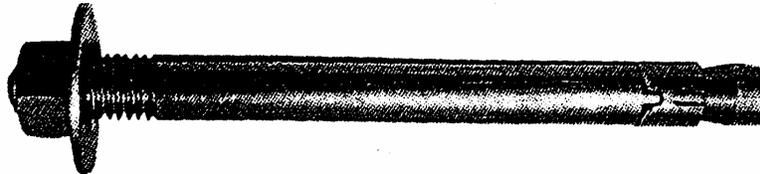
3. Turn the nut by hand until the unit is snugged up. Turn the nut with a wrench, approximately three full turns, to complete the fastening.



WEJ-IT - Example #1



ANKR-TITE® / STUD ANCHORS



- Bolt size is hole size.
- Extra heavy duty washer.
- Safety shoulder to maximize holding ability.
- Flex fold ears to grip the concrete.
- Made by Wej-It in the U.S.A.
- Clip design enhances easy hole installation.
- Safe-sure grip speeds setting in three turns.
- Highest performance standard in the industry.

ANCHOR DIAMETER AND LENGTH	MINIMUM EMBEDMENT (IN.)	MAXIMUM THICKNESS OF MATERIAL TO BE FASTENED (IN.)	QUANTITY BOX/CARTON	ZINC PLATED CATALOG NUMBER	MECHANICAL OR HOT DIP GALVANIZED CATALOG NUMBER	STAINLESS STEEL 302 HQ/303 CATALOG NUMBER	STAINLESS STEEL 316 CATALOG NUMBER
1/4 x 1 3/4 1/4 x 2 1/4 1/4 x 3 1/4	1 3/8	1/8 5/8 1 5/8	100/800 100/800 100/800	AT1413 AT1421 AT1431		ATS1413 ATS1421 ATS1431	ATSS1421 ATSS1431
3/8 x 2 1/4 3/8 x 2 3/4 3/8 x 3 3/8 x 3 3/4 3/8 x 5	1 3/4	1/8 5/8 7/8 1 5/8 2 7/8	50/400 50/400 50/400 50/400 50/300	AT3821 AT3823 AT3830 AT3833 AT3850	ATG3823 ATG3833	ATS3821 ATS3823 ATS3830 ATS3833 ATS3850	ATSS3823 ATSS3830 ATSS3833
1/2 x 2 3/4 1/2 x 3 3/4 1/2 x 4 1/4 1/2 x 5 1/2 1/2 x 7	2 1/8	1/8 1 1/8 1 5/8 2 7/8 4 3/8	25/200 25/200 25/200 25/150 25/150	AT1223 AT1233 AT1241 AT1252 AT1270	ATG1223 ATG1233 ATG1241 ATG1252	ATS1223 ATS1233 ATS1241 ATS1252 ATS1270	ATSS1223 ATSS1233 ATSS1241 ATSS1252
5/8 x 3 1/2 5/8 x 4 1/4 5/8 x 5 5/8 x 6 5/8 x 7 5/8 x 8 1/2	2 5/8	1/4 1 1 3/4 2 3/4 3 3/4 5 1/4	10/80 10/80 10/80 10/80 10/80 10/40	AT5832 AT5841 AT5850 AT5860 AT5870 AT5882	ATG5841 ATG5850 ATG5860	ATS5832 ATS5841 ATS5850 ATS5860 ATS5870 ATS5882	ATSS5841 ATSS5850 ATSS5860
3/4 x 4 1/4 3/4 x 4 3/4 3/4 x 5 1/2 3/4 x 7 3/4 x 8 1/2 3/4 x 10 3/4 x 12	3 1/4	1/4 3/4 1 1/2 3 4 1/2 6 8	10/80 10/80 10/60 10/60 10/40 10/40 5/20	AT3441 AT3443 AT3452 AT3470 AT3482 AT3410 AT3412	ATG3443 ATG3452 ATG3482	ATS3441 ATS3443 ATS3452 ATS3470 ATS3482 ATS3410 ATS3412	ATSS3443 ATSS3452 ATSS3470
1 x 6 1 x 9 1 x 12	4 1/2	1/2 3 1/2 6 1/2	5/30 5/20 5/20	AT1060 AT1090 AT1012		ATS1060 ATS1090 ATS1012	

NOTE: Nuts and Washers included.
Zinc Plated to ASTM B-633 Type III, SCl. Clear Chromate added.
Grades 304, 316 Stainless available upon request. Unpublished sizes available upon request.
Mechanical Galvanized ASTM B-695 Type I, Class 2S (Furnished with Stainless Steel Expansion Ring).
Special lengths available upon request.
GSA Specification FF-S-325, Group II, Type 4, Class I.

WEJ-IT - Example #2

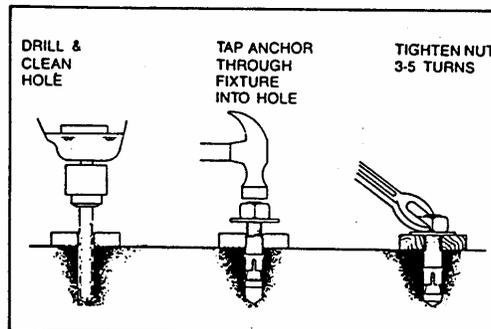


ANKR-TITE® / STUD ANCHORS

TECHNICAL INFORMATION

Ankr-tite® Installation Instructions

1. Always wear safety glasses.
2. Follow the drill manufacturer's safety instructions.
3. Use only solid carbide-tipped bits meeting the ANSI B94 tip diameter standard as shown on page 9.
4. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.
5. Drill the hole as deep as the full length of the anchor, but not closer than two anchor diameters to the bottom (opposite) surface of the concrete. Through drilling is allowed when using sleeve anchors in hollow concrete block.
6. Clean the hole using compressed air and a wire brush. A clean hole is necessary for proper performance.
7. Assemble the washer and nut on the anchor so the nut protrudes slightly beyond the thread.
8. Tap the anchor through the fixture and into the hole, making sure the nut or head rests solidly against the fixture.
9. Tighten the nut or head 3-5 turns past the hand tight position.



Sources: U.S. Testing Co., Inc., Tulsa, Oklahoma. Tested to ASTM E488 Test Standard. Bit diameters to ANSI B94.

Use one-fourth of values shown for a recommended 4 - 1 safety factor. Test report, dated December 17, 1984, available on request.

THREAD LENGTH

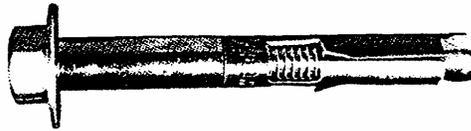
Ankr-tite Stud Anchors	
Dia.	Thread Length
1/4	1"
3/8	1 1/4"
1/2	1 1/2"
5/8	1 3/4"
3/4	2"
1	2 1/4"

Thread UNC Class 2A.

WEJ-IT - Example #3



SLEEVE ANCHORS



- Bolt size is hole size.
- Fully assembled and ready to use.
- Flex-fold ears eliminates rotation in the hole.
- Unique pillar design maximizes clamping ability.
- Rapid expansion sets in three turns.
- Highest performance standards in the industry.
- Useable in all masonry material - poured concrete or hollow concrete block.

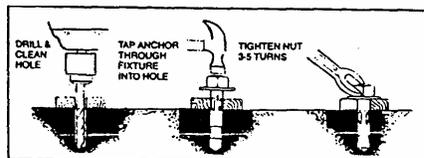
HEAD STYLE	ANCHOR DIAMETER, AND LENGTH (IN.)	MINIMUM EMBEDMENT (IN.)	MAX. THICKNESS OF MATERIAL TO BE FASTENED (IN.)	QUANTITY BOX/CARTON	CATALOG NUMBER
HEX NUT	5/16 x 1 1/2	1 1/4	5/16	100/800	HSA 5612
	5/16 x 2 1/2		1 5/16	100/800	HSA 5622
	3/8 x 1 7/8	1 1/2	3/8	50/400	HSA 3813
	3/8 x 3		1 1/2	50/400	HSA 3830
	1/2 x 2 1/4	1 7/8	7/16	25/200	HSA 1221
	1/2 x 3		1 3/16	25/200	HSA 1230
	1/2 x 4		2 3/16	25/200	HSA 1240
	5/8 x 2 1/4	2	1/2	25/200	HSA 5821
	5/8 x 3		1 1/4	25/200	HSA 5830
	5/8 x 4 1/4		2 1/2	10/80	HSA 5841
5/8 x 6	3 3/4		10/80	HSA 5860	
ROD COUPLING	3/4 x 2 1/2	2 1/4	1/4	10/80	HSA 3422
	3/4 x 4		1 3/4	10/80	HSA 3440
	3/4 x 6 1/4		4	10/80	HSA 3461
	3/8 x 1 7/8		1 1/2	3/8	50/400
	1/2 x 2 1/4	1 7/8	7/16	25/200	CSA 1221



NOTE: Zinc Plated to ASTM B-633 Type III, SCl. Clear Chromate added.
GSA Specification FF-S-325, Group II, Type 3, Class 3.
Thread UNC Class 1A.

Sleeve Anchors Installation Instructions

1. Always wear safety glasses.
2. Follow the drill manufacturer's safety instructions.
3. Use only solid carbide-tipped bits meeting the ANSI B94 tip diameter standard as shown on page 9.
4. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.
5. Drill the hole as deep as the full length of the anchor, but not closer than two anchor diameters to the bottom (opposite) surface of the concrete. Through drilling is allowed when using sleeve anchors in hollow concrete block.
6. Clean the hole using compressed air and a wire brush. A clean hole is necessary for proper performance.
7. Assemble the washer and nut on the anchor so the nut protrudes slightly beyond the thread.
8. Tap the anchor through the fixture and into the hole, making sure the nut or head rests solidly against the fixture.
9. Tighten the nut or head 3-5 turns past the hand tight position.



Sources: U.S. Testing Co., Inc., Tulsa, Oklahoma. Tested to ASTM E488 Test Standard. Bit diameters to ANSI B94. Use one-fourth of values shown for a recommended 4 - 1 safety factor. Test report # 100-111-1000

WEJ-IT - Example #4



DROP-IN ANCHORS

SIZE (IN.)	QUANTITY BOX/CARTON	ZINC PLATED CATALOG NUMBER	SETTING TOOLS CATALOG NUMBER
1/4	100/1000	WD-14	ST-14
3/8	50/500	WD-38	ST-38
1/2	50/400	WD-12	ST-12
5/8	25/200	WD-58	ST-58
3/4	25/100	WD-34	ST-34



NOTE: To achieve proper setting and anchor performance, use only ANKRITITE Setting Tools. Zinc Plated to ASTM B-633 Type III, SCl. Fed. Spec. QQZ-325C, Type II, Class 3. Clear Chromate added. GSA Specification FF-S-325, Group VII, Type I. Thread UNC Class 2A.

Drop-In Anchors Installation Instructions

1. Always wear safety glasses.
2. Follow the drill manufacturer's safety instructions.
3. Select the proper size drill bit from the chart below. Use only solid carbide-tipped bits meeting the ANSI B94 tip diameter standard as shown on page 9.
4. Drill the hole perpendicular to the work surface. To assure full holding power, do not ream the hole or allow the drill to wobble.
5. Drill the hole as deep as the full length of the anchor, but not closer than two anchor diameters to the bottom (opposite) surface of the concrete.
6. Clean the hole using compressed air and a wire brush. A clean hole is necessary for proper performance.
7. Tap the anchor into the hole, making sure that the top of the anchor is flush with or below the work surface.
8. Insert the setting tool provided into the threaded end of the anchor and expand the anchor by striking the end of the setting tool with a hammer. The anchor is set (fully expanded) when the shoulder of the setting tool touches the anchor. Full expansion is necessary for proper anchor performance.

TECHNICAL INFORMATION

Maximum Tensile and Shear Values

As tested in 28-day unreinforced stone aggregate concrete.

Anchor/NC Thread Size (in.)	Drill/Hole Size (in.)	Length Embedment (in.)	4000 psi	
			Tensile	Shear
1/4	3/8	1	3399	1597
3/8	1/2	1 5/8	5456	3931
1/2	5/8	2	8785	6599
5/8	7/8	2 1/2	13980	11365
3/4	1	3 1/4	19353	16740

Sources: U.S. Testing Co., Inc., Tulsa, Oklahoma. Tested to ASTM E488 Test Standard. Bit diameters to ANSI B94.

Use one-fourth of values shown for a recommended 4 - 1 safety factor. Test report, dated March 27, 1985, available on request.

WEJ-IT - Example #5



CHEMICAL FASTENING:
by UPAT

CHEMICAL MORTAR CARTRIDGE

Dimensions And Specifications

One UPAT® Chemical Mortar Cartridge provides 8.5 cubic inches of useable resin mortar. The following threaded rod specifications are examples of some applications. Virtually any application is possible. Product Bulletins giving specifications in greater detail (shallower embedments, deeper embedments, other fixture, etc.) are available upon request.

THREADED ROD SIZE	DRILL SIZE*	EMBEDMENT DEPTH	STUDS PER CARTRIDGE**
1/4"-20	5/16"	1-1/2"	95
5/16" - 18	3/8"	1-7/8"	56
3/8"-16	1/2"	2-1/4"	24
1/2"-13	5/8"	3"	14
5/8"-11	3/4"	3-3/4"	8
3/4"-10	7/8"	4-1/2"	5
7/8"-9	1"	5-1/4"	4
1"-8	1-1/8"	6"	2-1/2
1-1/4"-7	1-3/8"	7-1/2"	1-1/2

* Per ANSI B94.12-1977 ** One cartridge provides 8.5 cubic inches mortar

Test Data

The following test data is an example of the holding power of UPAT® Chemical Mortar when anchoring threaded rod to concrete. The results will vary for other fixtures and/or base materials. Product Bulletins giving test data in greater detail (shallower embedments, deeper embedments, other fixtures, etc.) are available upon request.

THREADED ROD SIZE	DRILL SIZE*	EMBEDMENT DEPTH	ULT. TENSILE LOAD**	ULT. SHEAR LOAD**
1/4"-20	3/8"	1-1/2"	1,035 lbs.	1,440 lbs.
1/2"-13	5/8"	3"	7,595 lbs.	6,685 lbs.
3/4"-10	7/8"	4-1/2"	13,910 lbs.	19,445 lbs.
1"-8	1-1/8"	6"	19,465 lbs.	26,775 lbs.

* Per ANSI B94.12-1977
** SAE Grade 2 Threaded Rod tested in 4430 PSI (28 days) normal weight, hard rock aggregate concrete. Ultimate values are shown. Actual results may vary and are dependent upon proper installation. General industry practice for static loads is to use a safety factor of 4:1 to obtain working loads.
Tested in accordance with ASTM E488; test standards.

These test results are given purely as a guide. Note that concrete strengths may vary greatly. In all cases, it is recommended that tests to simulate actual conditions be carried out to determine suitability of UPAT® Chemical Mortar for a particular application.

The UPAT® Chemical Mortar Cartridge is a unique, non-expanding chemical anchoring system that enables you to bond almost any kind of structural bar to almost any kind of building material . . . with no mess or complicated preparation!

Inside the cartridge are separate compartments containing premeasured amounts of polyester resin, quartz sand aggregate, and hardener. Pump the "T" handled plunger, and the three components are accurately, safely, and neatly mixed . . . all within the cartridge! Insert the activated cartridge into an ordinary caulking gun and you are ready to use!

The UPAT® Chemical Mortar Cartridge offers all the exceptional advantages of non-expanding chemical capsule anchoring:

- HIGH PULL-OUT LOADS
- IDEAL FOR VIBRATORY LOADS
- REDUCED CENTER-TO-CENTER AND CENTER-TO-EDGE DISTANCES
- MINIMAL "CREEP" OVER TIME
- USED WITH A WIDE VARIETY OF MATERIALS FROM SOFT BRICK TO HARD MARBLE OR GRANITE
- NO EXPANSION STRESS PLACED ON CONSTRUCTION MATERIALS
- CAN BE SET IN MOST WEATHER CONDITIONS
- COMPONENTS ARE PRE-MEASURED TO PREVENT JOE MIXING ERRORS AND ASSURE CORRECT DOSE

SEALS OUT HARMFUL CORROSIVES
GIVES THE FOLLOWING ADDED ADVANTAGES

Fills Voids

Useful for problem areas. Fills voids, cracks,

fissures, crevices, and irregular holes to permanently anchor fixtures. Perfect for brick building restoration.

Versatile

Chemically bonds studs, dowels, rebar, wire, flat bars, hooks . . . almost any metal fixture to granite, marble, stone, concrete, hollow brick, and block. UPAT® Chemical Mortar Cartridge is the right choice for these problem fastenings:

- VERY SHALLOW OR VERY DEEP EMBEDMENTS
- SMALL DIAMETER FIXTURES
- ODD SHAPED FIXTURES (FLAT BARS, SQUARE TUBES, ETC.)
- FASTENINGS TO BRITTLE BASED MATERIALS

Easy, No-Fuss Mixing

Just pump the "T" handled plunger to mix the sealed components. When the mortar turns red, it is properly mixed and ready to use.

No Special Tools Required

All mixing hardware comes with the cartridge. Application of the activated mortar is performed with a standard caulking gun. Fixtures are installed by hand, with no need for special drive units or adapters.

Storage Recommendations

For maximum shelf life, UPAT® Chemical Mortar Cartridges should be stored out of direct light in a controlled environment: 50°F to 100°F, well ventilated, and dry. Shelf life of up to one year is possible, but higher ambient temperatures and ultraviolet rays may shorten shelf life.

polyester resin and significantly reduce shelf life. An expiration date is shown on each cartridge.

IMPORTANT

- WEAR SAFETY GOGGLES AND PROTECTIVE CLOTHING.
- AVOID FUMES AND CONTACT WITH EYES AND SKIN.
- Activated mortar must be completely used within the recommended working time. Working time will vary with temperature and other field conditions. (See maximum working time in chart below.) It is recommended that application preparations be completed before mixing cartridge.

BASE MATERIAL TEMP.	MAXIMUM WORKING TIME	MINIMUM CURE TIME
104°F	5 min.	20 min.
68°F	20 min.	80 min.
32°F	120 min.	360 min.

DO NOT USE BELOW 32° F

- Do not disturb or load fastening until fully cured. Cure time will vary with temperature and other field conditions (see chart above).
- Using in concrete cured less than 7 days will greatly reduce anchor strength.
- Because dust in hole will significantly reduce fastening strength, operator must make special effort to clean hole thoroughly.
- When bonding smooth fixtures deform section of fixture to be embedded.
- Tubing should be plunger to prevent mortar from curing inside.

U.S. ANCHOR CORPORATION - Example #1



Buyline 6878

"We know U.S. Anchor has excellent products and prices but what we most appreciate is your great service and friendly voices."

Sharon Kubik
Youngstown Bolt & Supply
Youngstown, Ohio

The Kingpin Wedge Anchor is used for heavy duty fastening applications where high pullout values are required. The anchor and the hole diameter are the same, simplifying the anchor installation. The advanced design of the collar, with three protruding prongs to grip the interior of the hole, reduces the likelihood of the anchor's "spinning" during installation. In addition, hole depth is not critical, as the wedge is non-bottom bearing, although the hole must be at least as deep as the minimum embedment depth listed below. Proper installation requires cleaning out the hole. For maximum strength, the wedge anchor should be installed using a torque wrench set to the suggested level as provided in the instruction sheet. The wedge is used in a wide variety of structural applications, including fastening sheet metal, steel, aluminum angles or wood to concrete. Pipe-hanging, tilt-ups, bridges, elevator equipment, conveyors and highway construction frequently require the wedge type anchor. Due to its high resistance to vibratory loads, the wedge anchor is ideal for installing machinery, hand rails, dock bumpers & storage racks, etc. Wedge anchors are sold together with the appropriate nuts and washers, unassembled.

See ReCOIL Anchor for alternatives



CARBON STEEL ITEM CODE	304 304 STAINLESS STEEL ITEM CODE	316 STAINLESS STEEL ITEM CODE	FORCE APPLIED (LBS.) ITEM CODE	DIAMETER & LENGTH	MINIMUM EMBEDMENT	MINIMUM TENSILE	BOX IN QUANTITY	WEIGHT (LBS.) PER 100
W1416	W1416S	W1416S3		1/4" x 1 3/4"	1 1/8"	3/4"	100/1000	3.32
W1422	W1422S	W1422S3		1/4" x 2 1/4"	1 1/8"	3/4"	100/1000	3.92
W1432	W1432S			1/4" x 3 1/4"	1 1/8"	3/4"	100/1000	5.20
W3822	W3822S			3/8" x 2 1/4"	1 5/8"	7/8"	100/1000	8.22
W3826	W3826S	W3826S3		3/8" x 2 7/4"	1 5/8"	1 1/8"	100/1000	10.50
W3830	W3830S	W3830S3		3/8" x 3"	1 5/8"	1 1/8"	100/1000	11.36
W3836	W3836S	W3836S3		3/8" x 3 3/4"	1 5/8"	1 1/8"	100/1000	13.38
W3850	W3850S	W3850S3		3/8" x 5"	1 5/8"	1 1/8"	50/500	16.84
W3864	W3864S			3/8" x 6 1/2"	1 5/8"	1 1/8"	50/500	22.36
W1226	W1226S	W1226S3	W1226G	1/2" x 2 3/4"	2 1/4"	1 1/4"	50/500	20.00
W1236	W1236S	W1236S3		1/2" x 3 3/4"	2 1/4"	1 1/4"	50/500	26.12
W1242	W1242S	W1242S3	W1242G	1/2" x 4 1/4"	2 1/4"	1 1/4"	25/250	28.48
W1254	W1254S	W1254S3	W1254G	1/2" x 5 1/2"	2 1/4"	1 1/4"	25/250	32.48
W1270	W1270S	W1270S3	W1270G	1/2" x 7"	2 1/4"	1 1/4"	25/250	43.52
W1284	W1284S			1/2" x 8 1/2"	2 1/4"	1 1/4"	25/100	53.44
W12100	W12100S			1/2" x 10"	2 1/4"	1 1/4"	25/100	58.24
W12120	W12120S			1/2" x 12"	2 1/4"	1 1/4"	25/100	69.68
W5834	W5834S	W5834S3	W5834G	5/8" x 3 1/2"	2 3/4"	1 1/2"	25/250	41.60
W5844	W5844S	W5844S3		5/8" x 4 1/2"	2 3/4"	1 1/2"	25/250	47.04
W5850	W5850S	W5850S3	W5850G	5/8" x 5"	2 3/4"	1 1/2"	25/250	46.56
W5860	W5860S	W5860S3	W5860G	5/8" x 6"	2 3/4"	1 1/2"	25/250	57.84
W5870	W5870S	W5870S3		5/8" x 7"	2 3/4"	1 1/2"	25/250	72.40
W5884	W5884S	W5884S3		5/8" x 8 1/2"	2 3/4"	1 1/2"	25/100	83.84
W58100	W58100S			5/8" x 10"	2 3/4"	1 1/2"	10/40	96.60
W58120	W58120S			5/8" x 12"	2 3/4"	1 1/2"	10/40	102.97
W3442	W3442S	W3442S3		3/4" x 4 1/4"	3 3/8"	1 1/2"	20/200	65.20
W3446	W3446S	W3446S3	W3446G	3/4" x 4 3/4"	3 3/8"	1 1/2"	20/200	71.70
W3454	W3454S	W3454S3	W3454G	3/4" x 5 1/2"	3 3/8"	1 1/2"	20/80	78.40
W3462	W3462S			3/4" x 6 1/4"	3 3/8"	1 1/2"	10/100	90.60
W3470	W3470S	W3470S3		3/4" x 7"	3 3/8"	1 1/2"	10/100	98.00
W3484	W3484S	W3484S3	W3484G	3/4" x 8 1/2"	3 3/8"	1 1/2"	10/40	118.00
W34100	W34100S			3/4" x 10"	3 3/8"	1 1/2"	10/40	138.80
W34120				3/4" x 12"	3 3/8"	1 1/2"	10/40	169.20
W7860	W7860S		W7860G	7/8" x 6"	4"	2 1/4"	5/50	126.40
W7880	W7880S		W7880G	7/8" x 8"	4"	2 1/4"	5/20	160.80
W78100	W78100S			7/8" x 10"	4"	2 1/4"	5/20	197.20
W10060	W10060S		W10090G	1" x 6"	4 1/2"	2 1/4"	5/50	170.80
W10090	W10090S			1" x 9"	4 1/2"	2 1/4"	5/20	240.00
W100120	W100120S			1" x 12"	4 1/2"	2 1/4"	5/20	288.00
W100150				1" x 15"	4 1/2"	2 1/4"	BULK	366.40
W11490				1 1/4" x 9"	5 5/8"	3 1/4"	BULK	367.60
W114120				1 1/4" x 12"	5 5/8"	3 1/4"	BULK	460.00

U.L. Listed, FM Approved, ICBO, GSA Spec. FF-S-325 Group II, Type 4 Class 1, Los Angeles City Approval. DOT Approvals may vary on file. Utility Approvals on file.

*Other sizes of 316 S/S available upon special request.

Minimum embedment for satisfactory anchor performance is 4 1/2 bolt diameters. Deeper embedments will yield higher tension and shear capacity.

CEB CORPORATION - Example #1



GREATER HOLDING POWER!

Projections on the spring steel expansion collar of CEB's WedgeStud anchor dig into the concrete when the anchor is tapped into a pre-drilled hole. As the nut is tightened, the anchor pulls up, expanding the collar and securing the fixture. The more load applied to the anchor, the greater the expansion and the greater the holding power.

FAST, EASY INSTALLATION

The drilled hole diameter is the same size as the anchor diameter, which saves drilling time and reduces drill bit costs. The depth of the drilled hole is not critical as the anchor does not have to bottom in the hole to be set.

ELIMINATES HOLE SPOTTING AND REPOSITIONING OF FIXTURES

Holes can be drilled through the mounting holes of the fixture and the anchors can then be tapped into place and tightened.

ZINC AND CHROMATE PLATING

WedgeStuds are supplied with a zinc and chromate plating for extra protection. These anchors are also available with other platings or in stainless steel for special environmental requirements.

WIRE

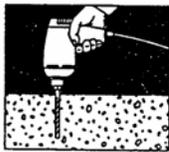
The wedge locking principle is ideally suited to overhead tie wire applications. The more weight hung from CEB's Tie Wire Anchor, the more the collar expands, increasing the holding power. No setting tools are required. The Tie Wire Anchor accommodates wire or rod up to one quarter inch in diameter. For loads over 500 lbs., it is best to set the Tie Wire WedgeStud by a pull with a claw hammer.

All sizes I.C.B.O. approved

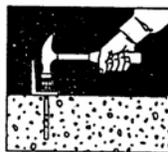
**the greater the load
the tighter the anchor**

FAST, SIMPLE INSTALLATION

Select anchor long enough to accommodate thickness of fixture and nut, plus minimum imbedment indicated.



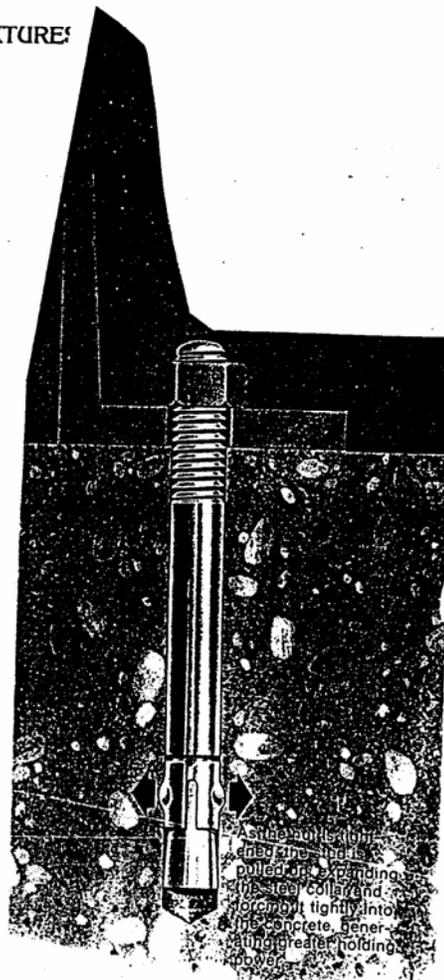
1. Drill hole the same diameter as WedgeStud. Hole can be drilled directly through mounting hole of fixture. The depth of hole should accommodate minimum recommended im-



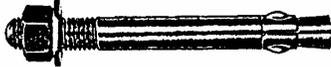
2. Insert WedgeStud and tap into hole so that at least six threads are below the top surface of fixture.



3. Tighten the nut. Resistance will increase quickly after three or four complete turns.



CEB CORPORATION - Example #2



WedgeStud ANCHORS SIZES and SPECIFICATIONS

STOCK NUMBER	SIZE (Inches)	THREAD LENGTH	HOLE SIZE	MINIMUM EMBEDMENT	QTY PER BOX/CARTON	WEIGHT PER 100
8025-15	1/4 x 1-5/8	3/4"	1/4"	1-1/8"	100/900	3.4 lbs.
8025-21	1/4 x 2-1/4	3/4"	1/4"	1-1/8"	100/900	4.2 lbs.
8025-30	1/4 x 3	3/4"	1/4"	1-1/8"	100/900	5.5 lbs.
8037-21	3/8 x 2-1/8	7/8"	3/8"	1-5/8"	100/600	9.3 lbs.
8037-23	3/8 x 2-3/4	1-1/8"	3/8"	1-5/8"	100/600	10.0 lbs.
8037-30	3/8 x 3-3/4	1-1/8"	3/8"	1-5/8"	100/600	14.0 lbs.
8037-50	3/8 x 5	1-1/8"	3/8"	1-5/8"	50/300	17.8 lbs.
8050-23	1/2 x 2-3/4	1-1/8"	1/2"	2-1/4"	50/300	20.8 lbs.
8050-33	1/2 x 3-3/4	1-1/4"	1/2"	2-1/4"	50/200	26.0 lbs.
8050-57	1/2 x 5-1/2	1-1/4"	1/2"	2-1/4"	25/150	36.0 lbs.
8050-70	1/2 x 7	1-1/4"	1/2"	2-1/4"	25/100	44.0 lbs.
8062-31	5/8 x 3-1/2	1-1/2"	5/8"	2-3/4"	25/150	42.0 lbs.
8062-41	5/8 x 4-1/2	1-1/2"	5/8"	2-3/4"	25/150	55.0 lbs.
8062-60	5/8 x 6	1-1/2"	5/8"	2-3/4"	25/100	66.0 lbs.
8062-81	5/8 x 8-1/2	1-1/2"	5/8"	2-3/4"	25/75	88.0 lbs.
8075-41	3/4 x 4-1/4	1-1/2"	3/4"	3-1/4"	20/80	76.0 lbs.
8075-51	3/4 x 5-1/2	1-1/2"	3/4"	3-1/4"	20/80	86.0 lbs.
8075-70	3/4 x 7	1-1/2"	3/4"	3-1/4"	10/40	104.0 lbs.
8075-81	3/4 x 8-1/2	1-1/2"	3/4"	3-1/4"	10/30	124.0 lbs.
8075-10	3/4 x 10	1-1/2"	3/4"	3-1/4"	10/30	142.0 lbs.
8087-60	7/8 x 6	2-1/4"	7/8"	4"	10/40	128.0 lbs.
8087-80	7/8 x 8	2-1/4"	7/8"	4"	10/30	164.0 lbs.
8087-10	7/8 x 10	2-1/4"	7/8"	4"	10/30	200.0 lbs.
8087-12	7/8 x 12	2-1/4"	7/8"	4"	5/15	236.0 lbs.
8010-60	1 x 6	2-1/4"	1"	4-1/2"	5/30	170.0 lbs.
8010-90	1 x 9	2-1/4"	1"	4-1/2"	5/15	240.0 lbs.
8010-12	1 x 12	2-1/4"	1"	4-1/2"	5/15	308.0 lbs.
8014-80	1-1/4 x 9	3-1/4"	1-1/4"	5-1/2"	5/15	372.0 lbs.
8014-12	1-1/4 x 12	3-1/4"	1-1/4"	5-1/2"	5/15	472.0 lbs.

All stock numbers available in stainless steel.

CEB CORPORATION - Example #3



GREATER HOLDING POWER

InterPlug anchors generate maximum holding power in concrete and other masonry materials. The smooth-walled anchor mates totally with the concrete as the anchor expands, providing an exceptional friction fit and maximum resistance to pull out forces.

The anchor expands uniformly over a larger area than other drop-in anchors. Pressure is consequently distributed over a wider area, generating greater holding power while minimizing stress on the concrete.

EASY INSTALLATION

CEB's InterPlug anchors are easy to install. The pre-assembled, internal lug expander simplifies the setting of the anchor and eliminates any problems associated with dropped or lost plugs.

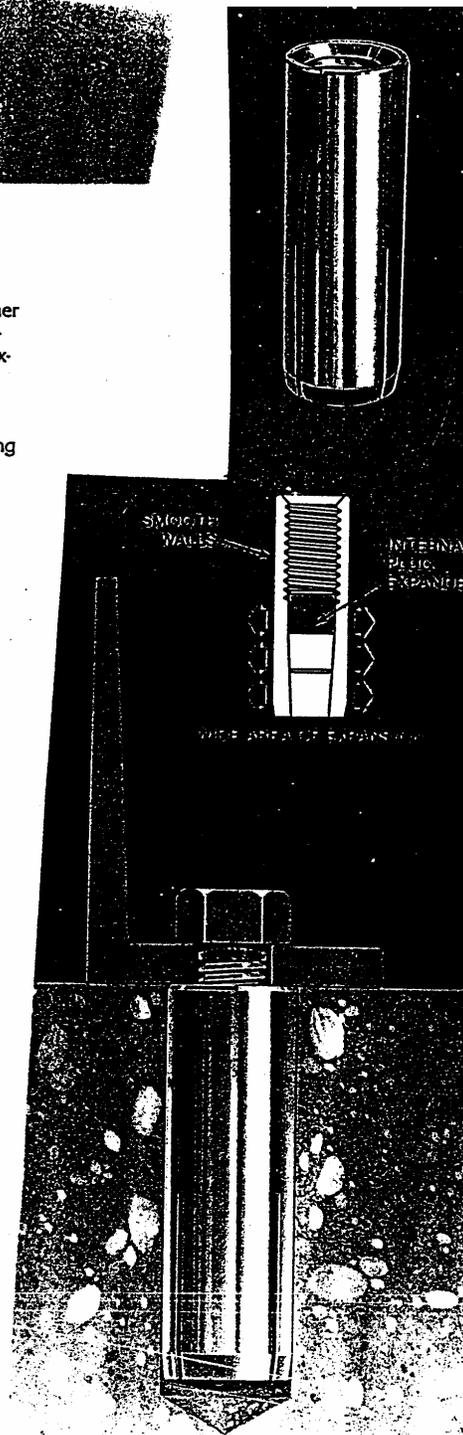
The expander plug can be set either with a hand-held hammer or with an impact tool. This permits the anchor to be set flush with the concrete or, if there is evidence of surface deterioration, the anchor can be set below the surface to maximize holding power and prevent spalling.

A smaller hole can be drilled for the InterPlug anchor than is required for other types of drop-in anchors.

ZINC PLATING

InterPlug anchors are zinc plated for corrosion resistance. Other platings are available upon request.

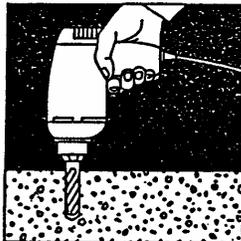
All sizes I.C.B.O. approved. U.L. and U.L.C. listed.



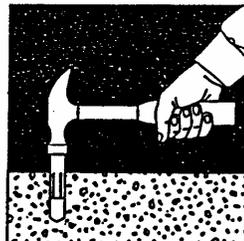
CEB CORPORATION - Example #4



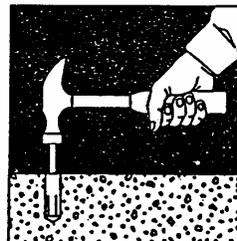
FAST, SIMPLE INSTALLATION



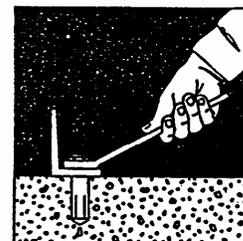
1. Drill hole 1/8" deeper than anchor length for flush mounting. Where surface deterioration is present drill hole somewhat deeper to permit anchor to be recessed below surface.



2. Drop InterPlug anchor into hole. If hole is slightly undersized, tap anchor in with hammer until it bottoms in hole.



3. To set expander plug, installation tool can be struck a few sharp blows with a hammer or an automatic air or electric tool can be used.



4. Place fixture in position, insert bolt and tighten.

SIZES and SPECIFICATIONS

STOCK NUMBER	BOLT SIZE	DRILL BIT DIAMETER	ANCHOR LENGTH	THREAD DEPTH	WEIGHT PER 100	BOX QTY	CARTON QTY	AVG. PULLOUT 4000 PSI CONCRETE**
7025-00	1/4"	5/16"	1"	7/16"	1.5 lb.	100	4000	2,220 lbs.
7037-00	3/8"	1/2"	1-1/2"	5/8"	6.3 lb.	50	1000	5,530 lbs.
7060-00	1/2"	5/8"	2"	11/16"	11.8 lb.	50	500	8,080 lbs.
7062-00	5/8"	7/8"	2-1/2"	7/8"	31.2 lb.	25	200	10,850 lbs.
7075-00	3/4"	1"	3-1/8"	1-3/8"	46.0 lb.	25	100	16,580 lbs.

*For flush installation, add 1/8" to anchor length for minimum drilled hole depth.

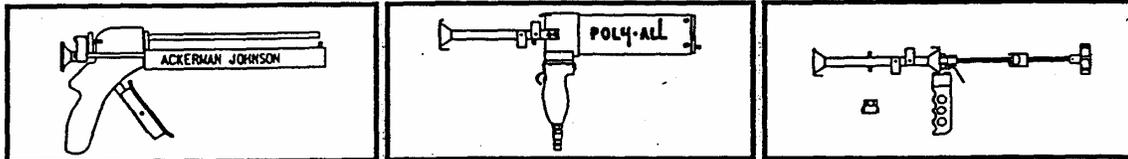
**Values shown are results by a certified independent laboratory. A safety ratio of 4 to 1 should be applied to above figures. All tests conducted in non-reinforced concrete. Meets or exceeds U.S. Federal Specifications FF-S-325, Group 2, Type 4, Class 1, Interim amendment-3 (Dated 7-16-65).

SETTING TOOLS

STOCK NUMBER	ANCHOR BOLT SIZE
7025-11	1/4"
7037-11	3/8"
7060-11	1/2"
7062-11	5/8"
7075-11	3/4"

SIMPSON STRONG-TIE COMPANY, INC. - Example #1

4 POLY-ALL™ EPOXY ANCHORING SYSTEM

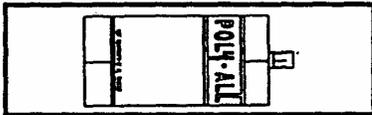


The Poly-All system consists of epoxy based chemical formulations, and unique mixing and dispensing tools that, in combination, provide a chemical anchor that is consistently reliable, has exceptional bonding strength and is easy and economical to use in a broad range of masonry applications.

DISPENSING TOOLS

CATALOG NUMBER	DESCRIPTION	QUANTITY BOX	CTN	WEIGHT POUNDS EACH
SPA-3000	MANUAL	1	1	6
SPA-4000	PNEUMATIC	1	1	8
SPA-3093	MANUAL (New)	1	1	6

POLY-ALL CARTRIDGE (22 FLUID OUNCE/39.6 CUBIC INCH)

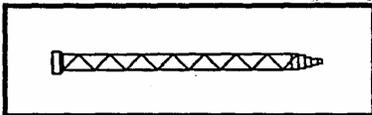


PAC-12*	WARM WEATHER-RAPID CURE (Use at temperatures above 45°F)	1	10	2
PAC-14*	COLD WEATHER-RAPID CURE (Use at temperatures 25°F-45°F)	1	10	2
PA-12*	RENOVATION FORMULATION-RAPID CURE (For use with screens)	1	10	2
PAC-24*	WARM WEATHER-STANDARD CURE (Use at temperatures above 40°F)	1	10	2

*International Conference of Building Officials (ICBO)-Date submitted and listing applied for September, 1991.

*City of Los Angeles (Renovation of Unreinforced Masonry Buildings)-Date submitted and approval applied for June, 1991.

DISPOSABLE MIXERS



PAM-37	MIXER Holes Under 1/2" Dia.	Bulk	.1
PAM-50	MIXER Holes 1/2" Dia. and Larger	Bulk	.1
PAM-58	MIXER-High Volume Holes	Bulk	.1
PAM-500	MIXER COUPLING NUT	Bulk	.3

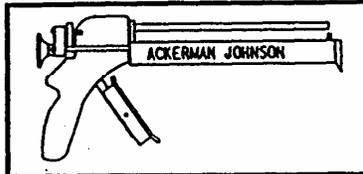
HOLES/CARTRIDGE SET

BOLT DIAMETER	HOLE SIZE DIA.	DEPTH	POLY-ALL	MIDPAK	MINIPAK
3/8	7/16	3-1/2	145	71	12
1/2	9/16	4-1/4	81	40	7
5/8	3/4	5	31	15	2-3/4
3/4	7/8	6-5/8	18	9	1-1/2
7/8	1	7-1/2	13	7	1-1/4
1	1-1/8	8-1/4	9	5	1

SIMPSON STRONG-TIE COMPANY, INC. - Example #2

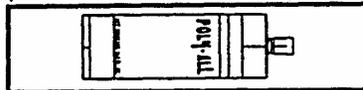
POLY-ALL™ EPOXY ANCHORING SYSTEM (cont'd) 5

MIDPAK TOOL



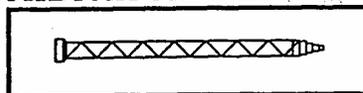
CATALOG NUMBER	DESCRIPTION	QUANTITY		WEIGHT POUNDS EACH
		BOX	CTN	
PA-3094	MIDPAK TOOL	1	1	2.8

MIDPAK CARTRIDGE
(1.1 FLUID OUNCE/19.8 CUBIC INCH)



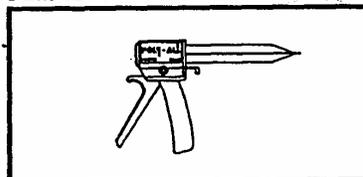
PAC-1220	WARM WEATHER-RAPID CURE (Use at temperatures above 45°F)	1	10	1.1
PAC-1420	COLD WEATHER-RAPID CURE (Use at temperatures 25°F-45°F)	1	10	1.1
RA-1220	RENOVATION FORMULATION RAPID CURE (For use with screens)	1	10	1.1
PAC-2420	WARM WEATHER-STANDARD CURE (Use at temperatures above 40°F)	1	10	1.10

MIDPAK MIXER



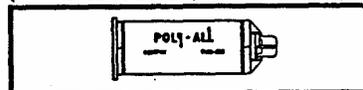
PAM-37	MIXER Holes Under 1/2" Dia.	Bulk		.1
PAM-50	MIXER Holes 1/2" Dia. and Larger	Bulk		.1
PAM-58	MIXER-High Volume Holes	Bulk		.1
PAM-500	MIXER COUPLING NUT	Bulk		.3

MINIPAK TOOL



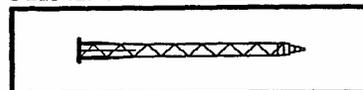
PA-30	MINIPAK TOOL	1	1	.6
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MINIPAK CARTRIDGE
(1.7 FLUID OUNCE/3.1 CUBIC INCH)



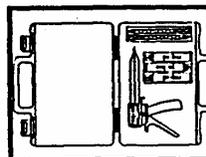
PAC-120	WARM WEATHER-RAPID CURE (Use at temperatures above 45°F)	12	24	.2
PAC-240	WARM WEATHER-STANDARD CURE (Use at temperatures above 40°F)	12	24	.2

MINIPAK MIXER



PAM-25	MIXING NOZZLE	Bulk		.1
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MINIPAK STARTER KIT

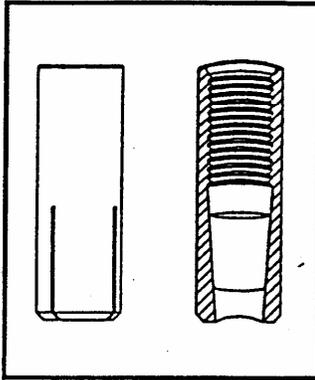


K-200	(1) PA-30 (3) PAC-120 (6) PAM-25 (1) Carrying Case	1	1	2.2
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SIMPSON STRONG-TIE COMPANY, INC. - Example #3

10

DROP-IN ANCHOR



The Drop-In Anchor is an internally threaded expansion anchor which comes complete with a pre-assembled expander plug. The design of the anchor makes it ideal for flush mounted applications. The design of its four slots assures uniform and dependable expansion. Standard sizes accept 1/4-3/4 UNC bolts or threaded rod. Select sizes also available with internally tapped coil threads.

MATERIAL SPECIFICATIONS

Zinc Plated Carbon Anchors

Anchor Body—AISI 12L14 Cold Rolled Steel. Meeting the chemical requirements of ASTM A-108.

Expander Plug—AISI 12L14/1215 Cold Rolled Steel. Meeting the chemical requirements of ASTM A-108

Thread—UNC 2B/Coil Thread

Plating—In accordance with Federal Specifications QQ-Z-325-C, Type II, Class 3

Stainless Steel

Anchor Body—AISI 303. Meeting the chemical requirements of ASTM A-582

Expander Plug—AISI 303

Thread—UNC 2B

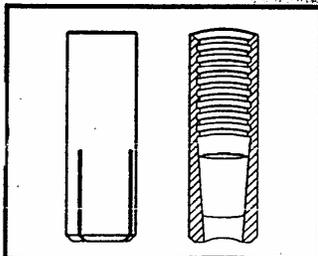
SELECTION CHART

SIZE	CATALOG NUMBER	BOLT DIAMETER-THREADS PER INCH	RECOMMENDED SIZE OF HOLES		ULTIMATE PULLOUT (lbs)	ULTIMATE SHEAR (lbs)
			DIA	DEPTH		
1/4	763-25	1/4 - 20	7/16	1-1/8	2240	1520
3/8	763-37	3/8 - 16	1/2	1-5/8	4150	3370
1/2	763-50	1/2 - 13	5/8	2-1/4	6850	6075
5/8	763-62	5/8 - 11	7/8	2-3/4	12000	10800
3/4	763-75	3/4 - 11	1	3-1/4	16000	13500

Meets requirements of Federal Specification FFS-325, Group VIII, Type 1. Test results in approximately 4500 PSI Concrete.

ORDER INFORMATION

SIZE	CATALOG NUMBER (CARBON STEEL)	CATALOG NUMBER (STAINLESS STEEL)	QUANTITY		WEIGHT PER 100 (lbs)
			BOX	CTN	
1/4	763-25	763-25SS	100	500	3
3/8	763-37	763-37SS	50	250	7
1/2	763-50	763-50SS	50	200	13
5/8	763-62	763-62SS	25	100	26
3/4	763-75	763-75SS	20	80	50



COIL THREAD DROP-IN ANCHOR

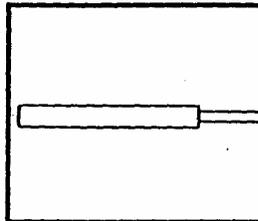
SIZE	CATALOG NUMBER	QUANTITY BOX CTN	WEIGHT PER 100 (lbs)
1/2	763-50C	50 200	13
3/4	763-75C	20 80	50

SIMPSON STRONG-TIE COMPANY, INC. - Example #4

DROP-IN ANCHOR (cont'd)

11

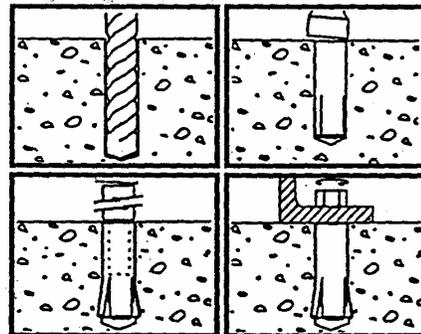
SETTING TOOL



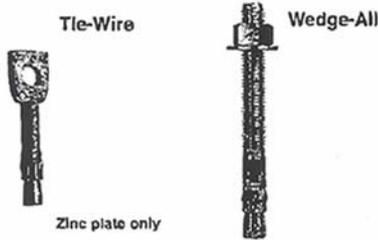
SIZE	CATALOG NUMBER	QUANTITY PER BOX
1/4	793-25-3	Bulk
3/8	793-37-3	Bulk
1/2	793-50-3	Bulk
5/8	793-62-3	Bulk
3/4	793-75-3	Bulk

INSTALLATION PROCEDURE

1. Drill hole 1/8" deeper than anchor length for flush mounting.
Where surface deterioration is present drill hole somewhat deeper to permit anchor to be recessed below surface.
2. Drop anchor into hole. If hole is slightly undersized, tap anchor in with hammer until it bottoms in hole.
3. To set expander plug, strike installation tool with hammer.
4. Place fixture in position, insert bolt and tighten.



WEDGE-ALL™ WEDGE ANCHORS



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 1/8" thru 3/8" 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.



Wedge-All Product Data

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

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 1/4" 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.

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.

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.

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
Up To 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



WEDGE-ALL™ WEDGE ANCHORS

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

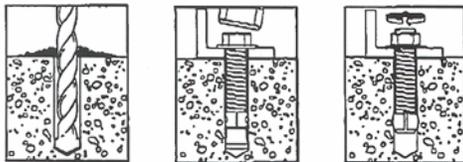
Size in. (mm)	Embed. Depth in. (mm)	Critical Spacing in. (mm)	Tension Load						Shear Load			Instal. Torque ft-lbs (N-m)
			f'c >= 2000 psi (13.8 MPa) Concrete			f'c >= 4000 psi (27.6 MPa) Concrete			f'c >= 2000 psi (13.8 MPa) Concrete			
			Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Ultimate 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)	950 (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)	6,280 (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)	728 (3.2)	2,150 (9.6)	8,720 (38.8)	1,698 (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)	1,462 (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)	38 (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)

- The allowable loads listed are based on a safety factor of 4.0.
- Allowable loads may be increased by 33 1/3% for short term loading due to wind or seismic forces.
- Refer to pages 50 & 51 for allowable load adjustment factors for spacing and edge distance.
- Drill bit used in base material to be same diameter as anchor.
- Hole to be 1/2" deeper than required embedment.
- Allowable tension load may be interpolated for concrete compressive strengths between 2000 psi and 4000 psi.
- 1/2" loads apply to Tie-Wire and Wedge-All.

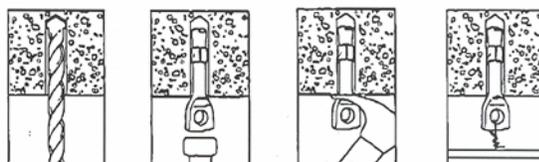
Wedge-All Installation Data

Wedge-All Dia (in)	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
Bit Size (in)	3/8	1/2	3/4	1 1/8	1 1/4	1 3/4	2	2 1/4	2 3/4
Fixture Hole (in)	3/8	1/2	3/4	1 1/8	1 1/4	1 3/4	2	2 1/4	2 3/4
Wrench Size (in)	3/8	1/2	3/4	1 1/8	1 1/4	1 3/4	2	2 1/4	2 3/4

Wedge-All Installation Sequence



Tie-Wire Installation Sequence



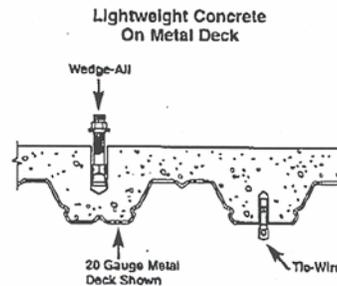
WEDGE-ALL™ WEDGE ANCHORS



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)			Tension Load (Install through Metal Deck) F _c >= 3000 psi (20.7 MPa)			Install. Torque ft-lbs (N-m)
		Concrete			Concrete			
		Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	
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)	3,850 (17.2)	564 (2.5)	985 (4.3)	60 (81.3)
	3 3/8 (85.7)	5,520 (24.6)	786 (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 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)	

See notes below



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)			Shear Load (Install through Metal Deck) F _c >= 3000 psi (20.7 MPa)			Install. Torque ft-lbs (N-m)
		Concrete			Concrete			
		Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	
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)
	3 3/8 (85.7)	8,800 (39.6)	742 (3.3)	2,225 (9.9)	8,560 (38.1)	114 (0.5)	2,140 (9.5)	
5/8 (15.9)	2 3/4 (69.9)	8,800 (39.6)	742 (3.3)	2,225 (9.9)	8,560 (38.1)	114 (0.5)	2,140 (9.5)	90 (122.0)
	3 3/8 (85.7)	10,400 (46.3)	486 (2.2)	2,600 (11.6)	11,040 (49.1)	321 (1.4)	2,780 (12.3)	

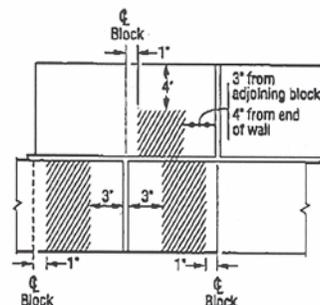
- The allowable loads listed are based on a safety factor of 4.0.
- Refer to pages 50 & 51 for allowable load adjustment factors for spacing and edge distance.
- Drill bit used in base material to be same diameter as anchor.
- Hole to be 1/2" deeper than required embedment.
- Concrete deck thickness 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		Shear Load		Install. Torque ft-lbs (N-m)
			Ultimate lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Allow. lbs. (kN)	
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)	3,860 (18.3)	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)
			5,400 (28.5)	1,600 (7.1)	7,540 (33.5)	1,885 (8.4)	150 (203.4)

- The allowable loads listed are based on a safety factor of 4.0.
- 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 mortar joint.
 - Minimum 1" from vertical cell centerline.
- 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.
- Embedment depth is measured from the outside face of the concrete masonry unit.
- Drill bit used in base material to be same diameter as anchor.
- Hole to be 1/2" 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.



WEDGE-ALL™ WEDGE ANCHORS

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

Design a connection comprised of two (2) 3/4" diameter Wedge-All 75614 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 3/4" dia. anchor at medium embedment = $S_{cr} = 20"$.
- $S_{act} < S_{cr}$ (reduction for spacing must be applied).
- Critical edge distance for 3/4" dia. anchor = $C_{cr} = 7 \frac{1}{2}"$.
- 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:

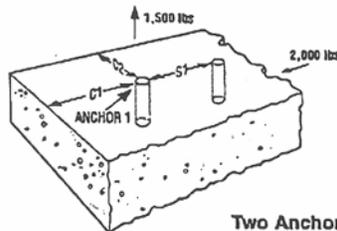
Unity Check:

(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)

$(1500 / 3862) + (2400 / 5460) = 0.83 \leq 1.00$ 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_{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
C_{act}	(In)	f_{cmin}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
		f_{cact}	0.70							
1										
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_{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
C_{act}	(In)	f_{cmin}	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
		f_{cact}	0.30							
1										
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_{cact} = percent of allowable load at critical edge distance. f_{cact} is always = 1.00.
6. f_{cmin} = percent of allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (C_{act} - C_{min}) / (C_{cr} - C_{min})]$.



WEDGE-ALL™ WEDGE ANCHORS

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

Design a connection comprised of two (2) 3/4" diameter Wedge-All 75614 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 3/4" dia. anchor at medium embedment = $S_{cr} = 20"$.
- $S_{act} < S_{cr}$ (reduction for spacing must be applied).
- Critical edge distance for 3/4" dia. anchor = $C_{cr} = 7 \frac{1}{2}"$.
- 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:

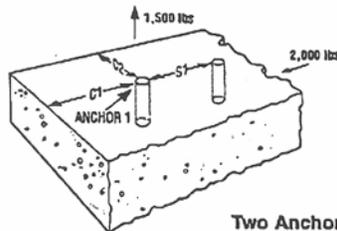
Unity Check:

(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)

$(1500 / 3862) + (2400 / 5460) = 0.83 \leq 1.00$ 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

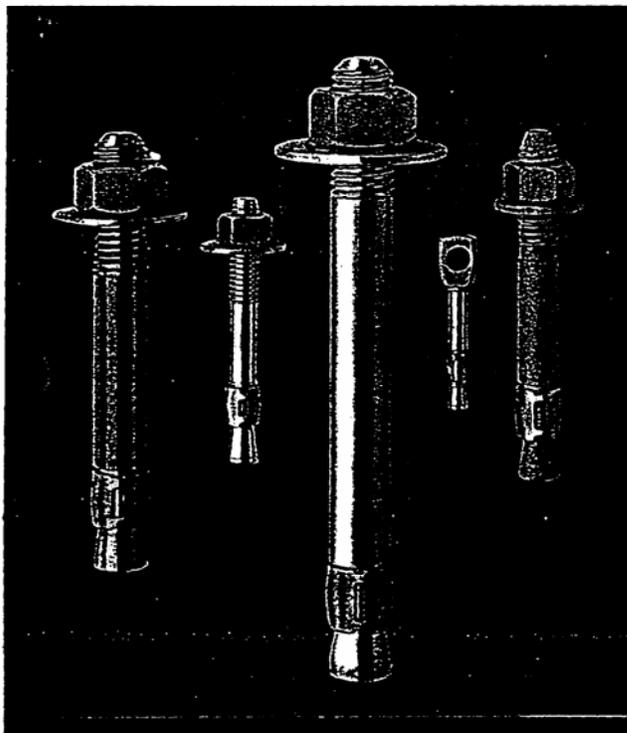
Edge Dist.	Size	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
C_{act}	C_{cr}	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	12 1/2	15
	C_{min}	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6
(In)	f_{cmin}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	f_{cact}	0.70								
1										
1 1/2		0.80	0.70							
2		0.90	0.77	0.70						
2 1/2		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
	f_{cact}	0.30								
1										
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_{cact} = percent of allowable load at critical edge distance. f_{cact} is always = 1.00.
6. f_{cmin} = percent of allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (C_{act} - C_{min}) / (C_{cr} - C_{min})]$.

COBRA ANCHORS CORPORATION - Example #1



CHOICE OF BOLT MATERIALS

The PARABOLT Concrete Anchor is stocked in four types to meet a wide variety of anchoring requirements: Grade 2 with zinc plating and clear chromate, Grade 5 with zinc plating and gold chromate, Grade 5 galvanized, and stainless steel.

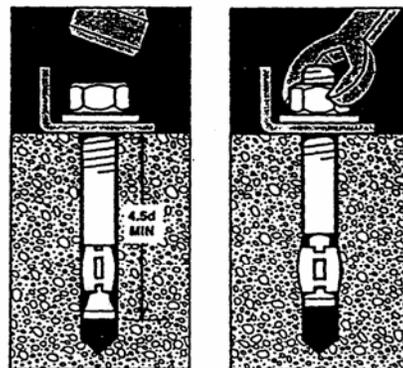
ONE-PIECE STAINLESS STEEL CLIP

Formed around the bolt in one piece, the PARABOLT Concrete Anchor's #304 stainless steel clip won't work loose or fall off during shipping or installation, and provides maximum resistance to corrosion and the pressures of installation.

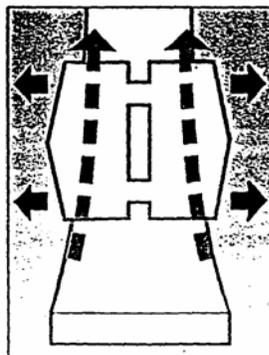
HOLE SIZE IS BOLT SIZE

The PARABOLT Concrete Anchor eliminates the need to drill an oversized hole, resulting in a minimum volume of concrete removed. This also avoids the confusion of choosing the right drill size.

EASY-TO-INSTALL



The PARABOLT Concrete Anchor combines heavy duty static load fastening capability in an easy-to-install anchor that can be loaded as soon as installed: Just drill the hole, insert the PARABOLT Concrete Anchor, and tighten! As the nut is tightened, the "Parabolic" shaft is pulled up, wedging the one-piece stainless steel clip into the sides of the hole.

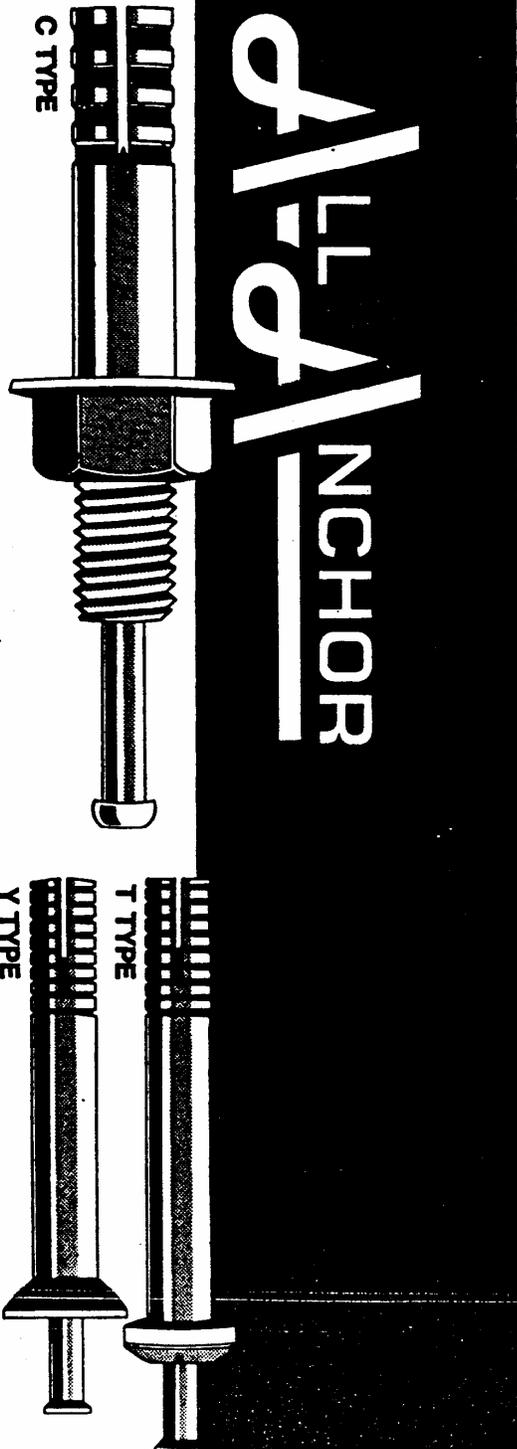


1. Using carbide bit (ANSI B94.12-1977) in same size as bolt diameter (d), drill hole deeper than bolt embedment (minimum 4.5 d). Do not use core bits. Maintain accurate hole size.
2. Clean hole of debris.
3. Add washer and thread nut flush with top of bolt. Drive bolt into hole through item to be fastened.
4. To set, tighten nut three full turns.

SAFETY GOGGLES REQUIRED.

GLOBAL DISTRIBUTING, INC. - Example #1

SANKO ANCHOR *with* QUALITY

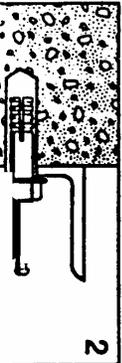


TYPICAL APPLICATIONS: Outlet Boxes • Stadium Seats • Steel Buildings • Wood Plates • Machine Locations • Parking Meters • Wall Hangers • Livestock Equipment • Belt Mountings • Distribution Pane • Bracing • Shelving • Baseboard Heating • Grain Bins

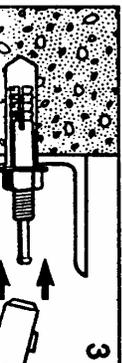
Drill hole to any depth exceeding minimum embedment using the All Drill Bit.



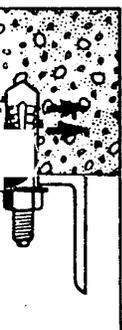
Preset the nut and washer for desired exposure.



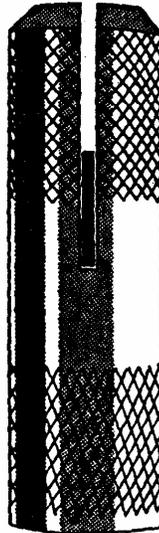
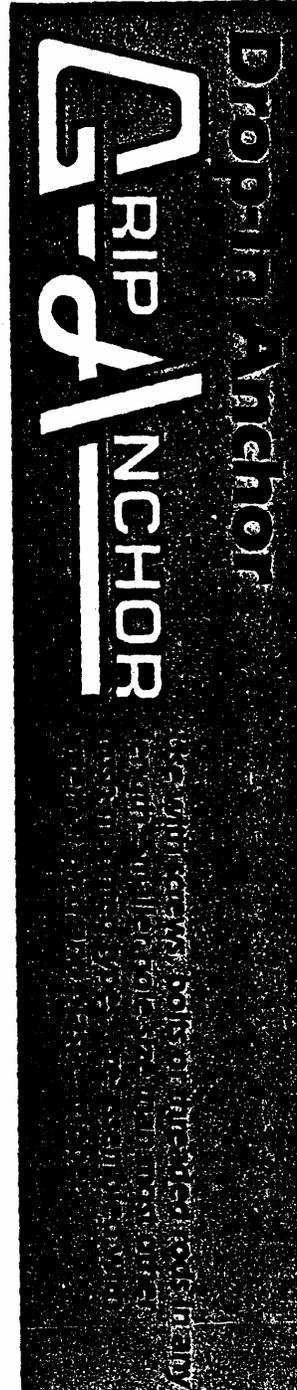
Drive pin flush with the top of All Anchor.



Slotted anchor base expands all four directions.



GLOBAL DISTRIBUTING, INC. - Example #2

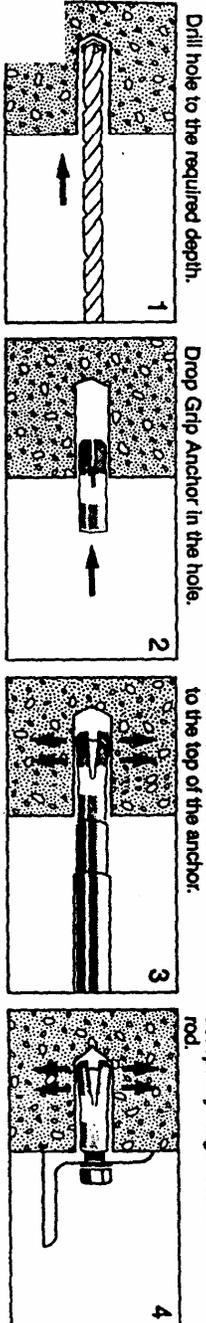


CT TYPE



CS TYPE

TYPICAL APPLICATIONS: Curtain Walls • Wood Sleepers • Roof Flashings • Joists and Beam Hangers
• Duct Straps • Pipe Run Supporters • Conduit Straps • Partitions • Signs



DFS/USA DIVERSIFIED FASTENING SYSTEM, INC. - Example #1, Page 1



The All American Anchor is a positive drive – positive setting anchor for use in all masonry materials.

PULL-OUT/SHEAR TEST RESULTS

DIAMETER	2000 PSI CONCRETE				4000 PSI CONCRETE	
	TENSION		SHEAR		TENSION	
	MIN. EMBED.	MAX. EMBED.	MIN. EMBED.	MAX. EMBED.	MIN. EMBED.	MAX. EMBED.
1/4"	(1") 900	(1 1/2") 1000	(1") 1600	(1") 1300	(1 1/2") 1400	
5/16"	(1 1/4") 1400	(1 7/8") 1500	(1 1/4") 3000	(1 1/4") 2100	(1 7/8") 2400	
3/8"	(1 1/2") 2200	(2 1/4") 2800	(1 1/2") 3400	(1 1/2") 3200	(2 1/4") 3700	
1/2"	(2") 3600	(3") 4200	(2") 7200	(2") 5600	(3") 5700	
5/8"	(2 1/2") 5400	(3 3/4") 6600	(2 1/2") 9200	(2 1/2") 7500	(3 3/4") 10,400	
3/4"	(3") 7500	(4 1/2") 9900	(3") 13,500	(3") 9500	(4 1/2") 13,400	

All American Anchors comply with these industry standards:
Meets I.C.B.O. standards REF: Report #4194
Meets City of Los Angeles Approval REF: 25109
Meets or exceeds G.S.A. Standards G.S.A. FF-S-325, Group V, Type 2, Class 2
Meets load factors in compliance with A.N.S.I. A58.1
Meets plating standards in compliance with A.S.T.M. B-633
Products tested in accordance with A.S.T.M. E-488.88
Tests conducted by CTI Engineering - Walnut Creek, CA 1993

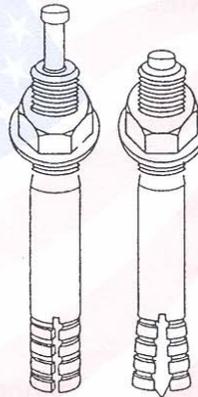
A safety factor of 4:1, or 25% of ultimate, should be used. Critical applications (vibratory loads, overhead installations, etc.) may require a safety factor of as much as 10:1, or more.

RECOMMENDED EMBEDMENT

Anchor Size Dia. x Length	Thread Length (In.)	Maximum Thickness Fastened	Drill Size
1/4 x 1 3/4	5/8	1/2	1/4
1/4 x 2 3/8	3/4	7/8	1/4
5/16 x 2 3/4	1	1 1/4	5/16
5/16 x 4	1 1/4	2 1/2	5/16
3/8 x 2 3/8	1	5/8	3/8
3/8 x 3 1/2	1 1/8	1 3/4	3/8
3/8 x 5	2	3 1/4	3/8
1/2 x 2 3/4	7/8	3/4	1/2
1/2 x 3 1/2	1 1/8	1 1/2	1/2
1/2 x 4 3/4	2	2 3/4	1/2
1/2 x 6	2	4	1/2
5/8 x 4	1 1/2	1 1/2	5/8
5/8 x 6	1 1/2	3 1/2	5/8
3/4 x 5	1 7/8	2 1/4	3/4
3/4 x 6	1 7/8	3 1/4	3/4

**ALL AMERICAN ANCHOR™
(Stud Type)**

The All American Anchor is an impact-expansion type concrete anchor. No special tools are required. The only tools needed are a drill (to bore the hole) and a hammer (to set the anchor). The body of the anchor is carbon steel and the drive pin is hardened steel. The entire anchor is yellow dicromate over zinc plating. Sizes available are listed below.



SIZES AVAILABLE

Item Number	Box Qty.	Size
14134AS	100	1/4 x 1 3/4
14238AS	100	1/4 x 2 3/8
56200AS	100	5/16 x 2
56234AS	100	5/16 x 2 3/4
56400AS	100	5/16 x 4
38238AS	100	3/8 x 2 3/8
38312AS	100	3/8 x 3 1/2
38500AS	50	3/8 x 5
12234AS	50	1/2 x 2 3/4
12312AS	50	1/2 x 3 1/2
12434AS	50	1/2 x 4 3/4
12600AS	30	1/2 x 6
58400AS	30	5/8 x 4
58434AS	25	5/8 x 4 3/4
58600AS	25	5/8 x 6
34500AS	20	3/4 x 5
34600AS	20	3/4 x 6

RECOMMENDED SPACING

Anchor Diameter	Embedment	Minimum Spacing between Anchors	Minimum Edge Distance
1/4"	1"	3 1/2	1 3/4
	1 3/4"	3 1/2	1 3/4
5/16"	1 1/8"	3 1/2	1 3/4
	2 1/8"	4	2
3/8"	1 1/4"	4 3/8	2 3/16
	2 1/2"	5	2 1/2
1/2"	1 1/2"	5 1/4	2 5/8
	3"	6	3
5/8"	1 3/4"	6 1/8	3 1/16
	3 1/4"	7 1/2	3 3/4
3/4"	2"	7	3 1/2
	3 1/2"	9	4 1/2

Anchor spacing recommendations serve only as a guideline. Spacing will vary as the density of the masonry material changes.

**MOST ORDERS SHIPPED UPS
THAT SAME DAY!**



DFS/USA

A product of the American-do spirit.
DIVERSIFIED FASTENING SYSTEMS INC.

CHARLES CITY, IOWA
800-833-6417
Fax 641-228-6124

DFS/USA DIVERSIFIED FASTENING SYSTEM, INC. - Example #1, Page 2



STUD-TYPE

ALL AMERICAN ANCHORS®

A PIN-DRIVE EXPANSION ANCHOR

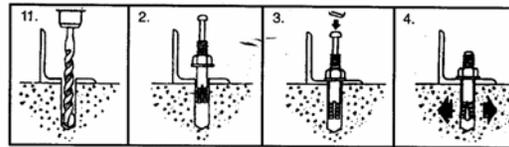
- **EASY TO USE:**
 - Drill hole same size as anchor diameter
 - Insert anchor with nut and washer attached
 - Hammer pin until flush
- **VISUALLY INSPECTABLE AFTER SET**
- **CARBON STEEL BODY WITH HARDENED SETTING PIN**
- **HIGH PULL-OUT & SHEAR STRENGTH**
- **ZINC & DICHROMATE PLATED**
- **NUTS & WASHERS INCLUDED**
- **AVAILABLE IN STAINLESS STEEL (BULK ONLY)**
- **ALL AMERICAN ANCHORS ARE PACKAGED IN:**
 - 100 Count Open Stock Boxes
 - Bulk Packaging

WHAT ADVANTAGES ARE THERE?

1. *The nut and washer can be preset for your desired embedment... Choose flush at the top or screw to the bottom for stud-type applications.*

2. *The All American Anchor is visually inspectable after set. When the pin is hammered down to meet the threads, the anchor is fully set. **NO GUESSWORK** or torque necessary like a Wedge Anchor or Sleeve Anchor.*

INSTALLATION PROCEDURE



1. Drill hole of sufficient depth using same diameter DFS Bit as anchor being installed.
 2. Turn nut on anchor as required. May be flush with top or turned on fully to provide stud finish.
 3. With nut, washer, and set-pin in place, insert anchor into hole.
 4. Using a proper sized hammer, set pin with several sharp and square strikes on head of pin until pin is flush with top of anchor. Anchor is now properly set.
 5. No need to torque nut to set anchor.
- WARNING:** Wear eye protection.

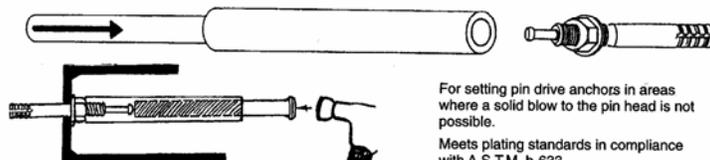
WHERE DO I USE All American Anchors?

- Outlet Boxes
- Stadium Seats
- Steel & Wood Plates
- Machine Anchoring
- Water & Gas Meters
- Mail Boxes
- Cash Machines
- Conveyor Belt Mounts
- Bracing
- Shelving
- Hand & Guard Rails
- Grain & Storage Bins
- Light Fixtures
- Steel Buildings

ALL AMERICAN ANCHOR™ SETTING TOOLS

The All American Anchor Setting Tools were designed for setting anchors in areas where a solid blow to the anchor pin is not possible, (such as deep electrical boxes). This hardened steel tool is zinc and yellow dichromate plated.

Item Number	Box Qty.	Size
14560ST	1	1/4" to 5/16"
38120ST	1	3/8" to 1/2"
58340ST	1	5/8" to 3/4"



For setting pin drive anchors in areas where a solid blow to the pin head is not possible.
 Meets plating standards in compliance with A.S.T.M. b-633.

DFS/USA DIVERSIFIED FASTENING SYSTEM, INC. - Example #2, Page 1



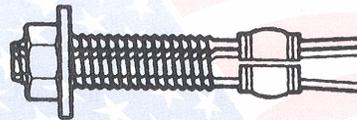
DFS WEDGE ANCHORS™

FOR HEAVY-DUTY ANCHORING TO POURED CONCRETE & BRICK

The DFS Wedge Anchor has a carbon steel anchor body and clip which ensures proper anchoring in all masonry materials.

CARBON STEEL AND 303 STAINLESS STEEL SIZES

Carbon Steel Item Number(1)	Box Qty.	Size
14134WS	100	1/4 x 1 3/4
14214WS	100	1/4 x 2 1/4
14314WS	100	1/4 x 3 1/4
56218WS	100	*5/16 x 2 1/8
56234WS	100	*5/16 x 2 3/4
56300WS	100	*5/16 x 3
56400WS	100	*5/16 x 4
38214WS	100	3/8 x 2 1/4
38234WS	100	3/8 x 2 3/4
38300WS	100	3/8 x 3
38312WS	100	3/8 x 3 1/2
38334WS	100	3/8 x 3 3/4
38500WS	50	3/8 x 5
38612WS	50	3/8 x 6 1/2
12234WS	50	1/2 x 2 3/4
12334WS	50	1/2 x 3 3/4
12414WS	25	1/2 x 4 1/4
12512WS	25	1/2 x 5 1/2
12700WS	25	1/2 x 7
12812WS	25	1/2 x 8 1/2
12100WS	25	1/2 x 10
12120WS	25	1/2 x 12
58312WS	25	5/8 x 3 1/2
58412WS	25	5/8 x 4 1/2
58500WS	25	5/8 x 5
58600WS	25	5/8 x 6
58700WS	25	5/8 x 7
58812WS	25	5/8 x 8 1/2
58100WS	25	5/8 x 10
58120WS	25	5/8 x 12
34414WS	20	3/4 x 4 1/4
34434WS	20	3/4 x 4 3/4
34512WS	20	3/4 x 5 1/2
34614WS	10	3/4 x 6 1/4
34700WS	10	3/4 x 7
34812WS	10	3/4 x 8 1/2
34100WS	10	3/4 x 10
34120WS	10	3/4 x 12
78600WS	5	*7/8 x 6
78800WS	5	*7/8 x 8
78100WS	5	*7/8 x 10
16000WS	5	*1 x 6
19000WS	5	*1 x 9
11200WS	5	*1 x 12



(316 Available on Request)

TEST RESULTS FOR DFS WEDGE ANCHOR

DIAMETER	2000 PSI CONCRETE			4000 PSI CONCRETE	
	TENSION		SHEAR	TENSION	
	MIN. EMBED.	MAX. EMBED.		MIN. EMBED.	MAX. EMBED.
1/4"	(1") 900	(1 1/2") 1000	(1") 900	(1") 1500	(1 1/2") 2000
5/16"	(1 1/4") 1400	(1 7/8") 1500	(1 1/4") 2700	(1 1/4") 1900	(1 7/8") 3700
3/8"	(1 1/2") 2200	(2 1/4") 2800	(1 1/2") 4100	(1 1/2") 3600	(2 1/4") 4800
1/2"	(2") 3600	(3") 4200	(2") 6400	(2") 4800	(3") 8200
5/8"	(2 1/2") 5400	(3 3/4") 6600	(2 1/2") 9400	(2 1/2") 6500	(3 3/4") 9700
3/4"	(3") 7500	(4 1/2") 9900	(3") 14,800	(3") 7200	(4 1/2") 13,700
7/8"	(3 1/2") 11,300	(5 1/4") 13,700	(3 1/2") 21,500	(3 1/2") 12,800	(5 1/4") 16,300
1"	(4") 9800	(6") 15,800	(4") 27,300	(4") 13,700	(6") 21,000

DFS Wedge Anchors comply with these industry standards:

- Meets I.C.B.O. standards REF: Report #4194
- Meets load factors in compliance with A.N.S.I. A58.1
- Meets or exceeds G.S.A. Standards G.S.A. FF-S-325, Group II, Type 4, Class 1
- Meets plating standards in compliance with A.S.T.M. B-633
- Products tested in accordance with A.S.T.M. E-488.88

Tests conducted by CTI Engineering - Walnut Creek, CA 1993

A safety factor of 4:1, or 25% of ultimate, should be used. Critical applications (vibratory loads, overhead installations, etc.) may require a safety factor of as much as 10:1, or more.

(1) - FOR STAINLESS CHANGE ITEM # LETTERS TO SW

CALL FOR SPECIAL QUOTE ON STAINLESS MINIMUMS REQUIRED

MOST ORDERS SHIPPED THAT SAME DAY!



DFS/USA

A product of the American-do spirit.
DIVERSIFIED FASTENING SYSTEMS INC.

CHARLES CITY, IOWA
800-833-6417
Fax 641-228-6124

DFS/USA DIVERSIFIED FASTENING SYSTEM, INC. - Example #2, Page 2



DFS WEDGE ANCHORS™

FOR HEAVY-DUTY ANCHORING TO POURED CONCRETE & BRICK

- A STANDARD WEDGE-TYPE ANCHOR FOR POURED CONCRETE & BRICK
- CARBON STEEL ANCHOR BODY AND CLIP (ALSO AVAILABLE IN STAINLESS STEEL).
- DRILL SAME HOLE DIAMETER AS THE ANCHOR DIAMETER
- EXTRA THREADS FOR LOCKING NUTS OR SHIMS
- ZINC PLATED ANCHOR BODY, CLIP, NUTS AND WASHERS
- AVAILABLE IN OPEN STOCK BOXES OR BULK
- CONFORMS TO THE FOLLOWING LISTINGS/APPROVALS:

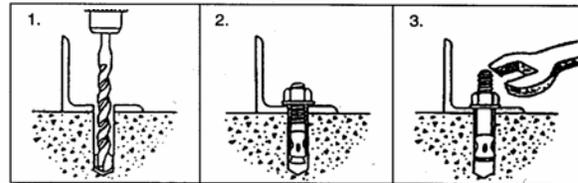
Meets I.C.B.O. standards REF: Report #4194
Meets G.S.A. Standards G.S.A. FF-S-325, Group II, Type 4
Meets load factors in compliance with A.N.S.I. A58.1
Meets plating standards in compliance with A.S.T.M. B-633
Products tested in accordance with A.S.T.M. E-488.88

WHAT ADVANTAGES ARE THERE?

DFS WEDGE ANCHORS can be used in deep electrical boxes where a solid hammer blow to the head of a pin-drive anchor is not possible.

DFS WEDGE ANCHORS can be used near the edge of poured concrete floors and steps with a reduced risk of cracking or "blowing out" the concrete.

INSTALLATION PROCEDURE



1. Drill hole deeper than embedment using an ANSI approved drill bit. Same diameter as the anchor diameter.

2. Tap anchor into hole with nut and washer attached.

3. Tighten nut 3-5 turns until anchor wedges securely.

WHERE DO I USE DFS WEDGE ANCHORS?

- Steel & Wood Plates
- Outlet Boxes
- Mail Boxes
- Guard Rails
- Grain & Storage Bins
- Steel Buildings
- Shelving & Bracing
- Stadium Seating
- Sign Bases
- Hand Rails
- Light Fixtures
- Machine Anchoring
- Water & Gas Meters
- Storage Tanks
- Pipe Hanger Mounts
- Phone Booths
- Headers
- Dock Bumpers
- Equipment Racks
- Conveyor Belt Mounts
- Manhole Applications