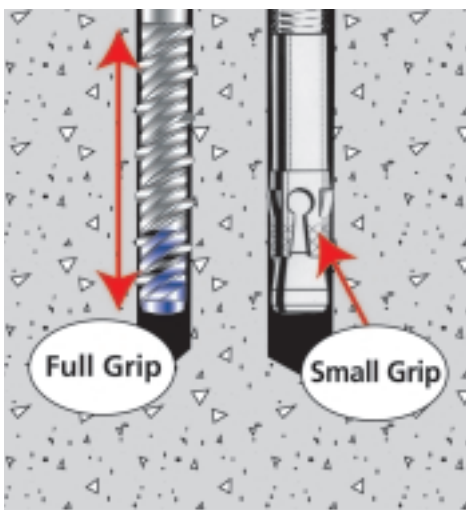
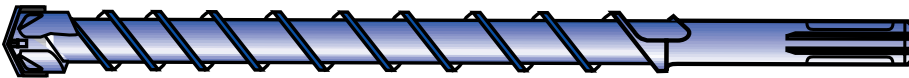
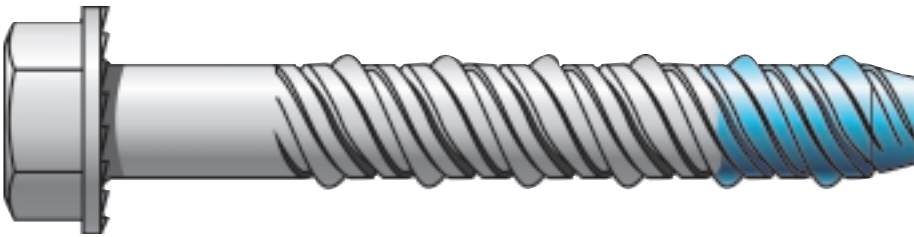


Wedge-Bolt®



PRODUCT SUBMITTAL (Wedge-Bolt)

RE: COMPANY AND PRODUCT NAME CHANGES

To our valued customers:

Please be advised that our company's name has been changed from "The Rawlplug Company, Inc." to "Powers Fasteners, Inc." Our corporate address is as follows:

Powers Fasteners, Inc. 2 Powers Square New Rochelle, NY 10801

Phone: (914) 235-6300 Fax: (914) 576-6483

The product name changes noted below were made due to marketing considerations only. This letter certifies that the products themselves have not changed in any way and are identical to those sold under their former name. Please use this information to update your records.

Product – New Name	Formerly Known As
Power-Bolt	Rawl-Bolt
Power-Stud	Rawl-Stud
DRIVE	Rawl DRIVE
Fiberplug	Rawlplug
Polly	Rawly
Power-Fast Epoxy Injection Gel	Foil-Fast Epoxy Injection Gel
Hammer-Capsule	Rawl Hammer-Capsule
Chem-Fast II	Rawl Chem-Fast
Powerlite	Rawlite

Should you have any questions or require further information, please feel free to contact our Customer Service Department at (914) 235-6300. Thank you for your interest in Powers Fasteners.



PRODUCT SUBMITTAL (Wedge-Bolt)

Wedge-Bolt® Anchoring System

PROJECT SUBMITTAL

Anchoring into Concrete and Masonry Substrates

Suitable for Solid and Hollow Base Materials

A Unique One Piece Self-tapping Screw Style Mechanical Anchor

Vibration Resistant and Completely Removable

Reusable in the Same Anchor Hole or in a Fresh Anchor Hole



Outperforms Traditional Wedge Style Mechanical Anchors

Does not Exert Expansion Forces into Base Material

Available in Carbon Steel and Mechanically Galvanized Steel

POWERS FASTENERS, INC.

Product Description

General Information

Installation Procedures

Engineering Data

Specifications

PRODUCT APPROVALS

International Conference of Building Officials (ICBO) ER #5788

City of Los Angeles (COLA) RR #25415

Southern Building Code Conference International (SBCCI) #2124

Meets AC01 Criteria for Mechanical Anchors

Approved for High Seismic and Wind Applications

Acceptable for Applications in DOT Projects

PRODUCT SUBMITTAL (Wedge-Bolt)

PRODUCT SUBMITTAL / SUBSTITUTION REQUEST

TO:

PROJECT:

SPECIFIED ITEM:

Section

Page

Paragraph

Description

PRODUCT SUBMITTAL / SUBSTITUTION REQUESTED :

The attached submittal package includes the product description, specifications, drawings, and performance data for use in the evaluation of the request.

SUBMITTED BY:

Name:

Signature:

Company:

Address:

Date:

Telephone:

Fax:

FOR USE BY THE ARCHITECT AND/OR ENGINEER

☐ **Approved** ☐ **Approved as Noted** ☐ **Not Approved**

(Please briefly explain why the product was not approved.)

By:

Date:

Remarks:

PRODUCT SUBMITTAL (Wedge-Bolt)



Wedge-Bolt®

BASE MATERIAL

Concrete, Block, Brick, Stone

SIZE RANGE

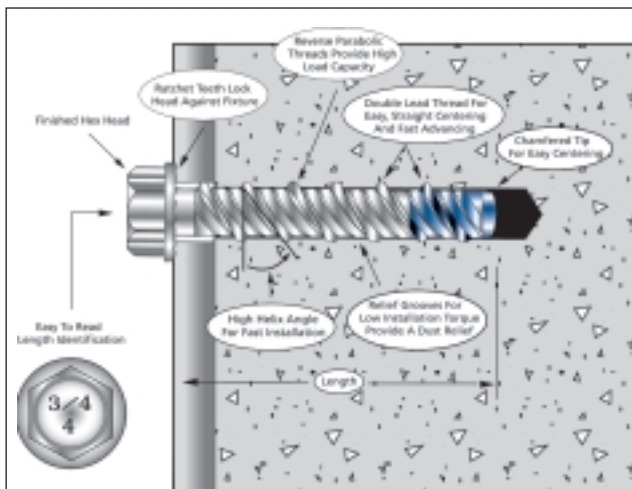
3/16" x 1-1/4" to 3/4" x 8"

ANCHOR MATERIAL

Heat Treated, High Strength Carbon Steel

PRODUCT DESCRIPTION

The Wedge-Bolt anchor is a one piece, heavy duty anchor with either a finished hex head or countersunk Phillips flat head. It is easy to identify, removable and vibration resistant. The Wedge-Bolt anchor also has many unique features and benefits that make it well suited for almost every application. Optimum performance is obtained using a combination of patented design concepts. The benefit to the designer is higher load capacities while the benefit to the user is ease of installation.

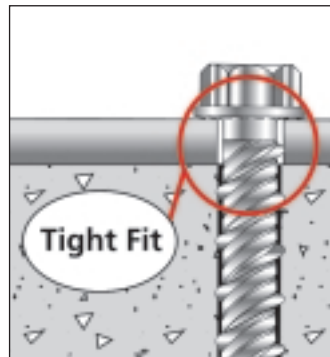


ONE-PIECE DESIGN



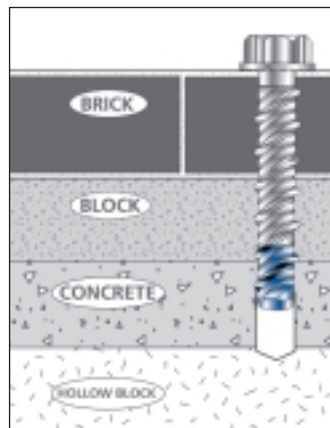
The Wedge-Bolt anchor is a one-piece unit which features a finished hex head formed with an integral washer, a patented dual lead thread, and a chamfered tip. A one-piece design eliminates the possibility of lost anchor parts or improper assembly.

MATCHES STANDARD FIXTURE HOLES



The Wedge-Bolt anchor is designed to match standard fixture clearance holes that are 1/16" over nominal to provide a secure fit. Since the Wedge-Bolt is specially matched to the clearance hole, the need for layout or hole spotting is eliminated.

WORKS IN MOST BASE MATERIALS



The Wedge-Bolt anchor is versatile and can be used in a variety of base materials. This reduces the need to stock assorted anchor types and learn a variety of installation procedures. A function test (i.e. trial installation) in the actual base material is recommended for high density precast concrete and slabs with compressive strengths greater than 5,000 psi.

MATCHED TOLERANCE SYSTEM

The Wedge-Bolt anchor is designed to be used with a matched tolerance Wedge-Bit for optimum performance. This high performance bit has a special tolerance range to ensure optimum results. Remember ... Blue tip, Blue bit!

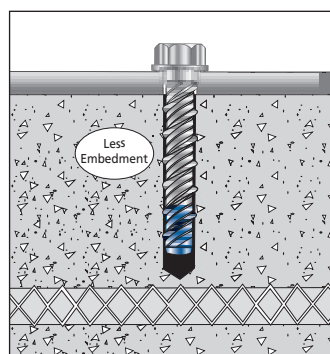


Blue Tip



Blue Bit

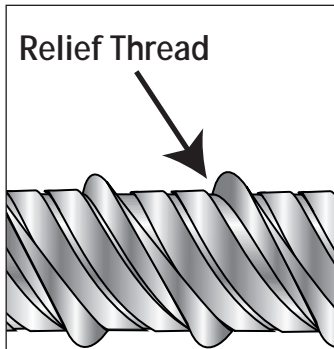
SHALLOW EMBEDMENT DEPTH



The Wedge-Bolt anchor can be installed at shallower embedment depths than traditional wedge or sleeve anchors reducing the chance of striking reinforcing bars or embedded cables. Drilling time and bit wear can be reduced resulting in significant savings.

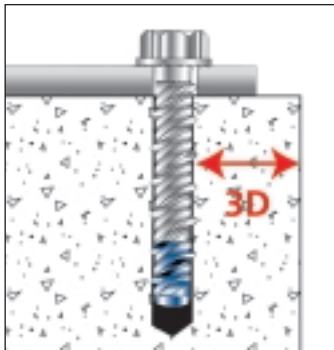
PRODUCT SUBMITTAL (Wedge-Bolt)

LOW INSTALLATION TORQUE



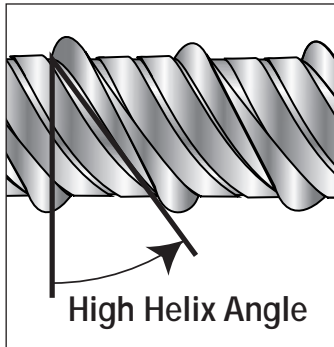
A specially designed relief thread formed in the body of the anchor allows easy tightening at a reduced torque level and provides dust relief to help reduce jamming of the anchor.

CLOSE TO EDGE INSTALLATION



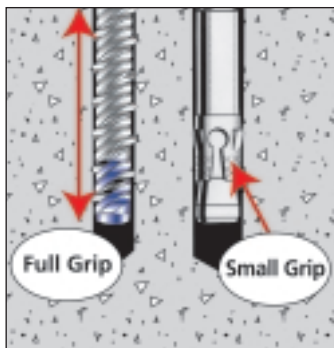
The Wedge-Bolt anchor cuts a thread into the base material. Since there are no expansion forces, the Wedge-Bolt anchor can be installed closer to the edge than traditional mechanical anchors without damaging the base material.

FAST, EASY, SAFE, HIGH SPEED INSTALLATION



The Wedge-Bolt anchor is fast, easy and safe to install. A chamfer on the working end quickly centers the anchor and a high 30° helix angle allows it to be tightened quickly. The controlled "screw-in" method is safer than the hammer driving method used with traditional anchor types.

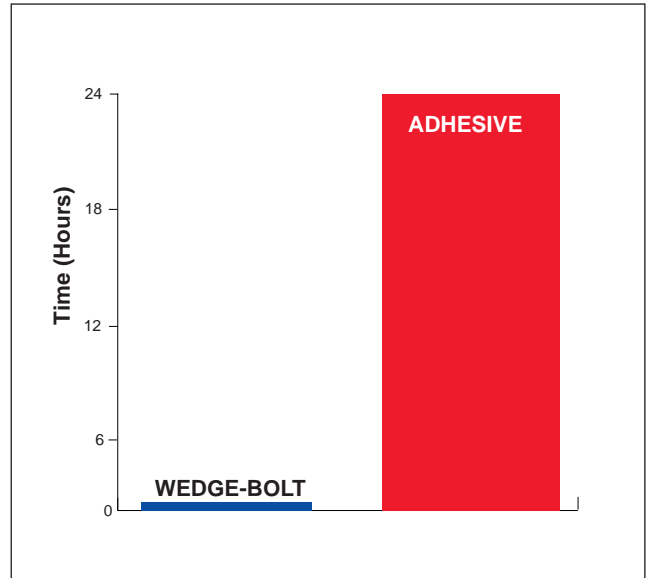
WON'T SPIN IN THE HOLE



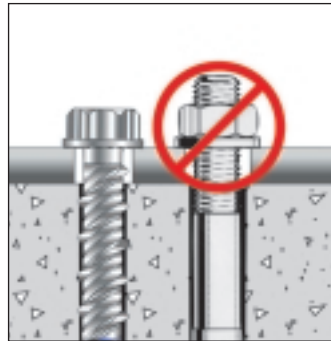
The Wedge-Bolt anchor has specially designed dual threads that engage the base material immediately upon tightening. Unlike traditional wedge or sleeve type anchors, they will not spin in the hole when attempting to tighten.

IMMEDIATE, HIGH STRENGTH LOADING

The Wedge-Bolt anchor can be loaded immediately. Unlike adhesive anchors, there is no lengthy curing time.

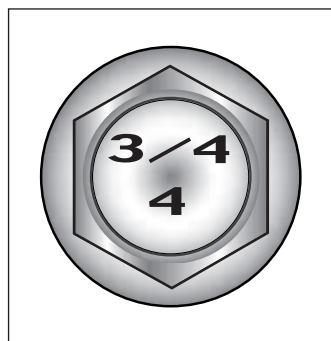


FINISHED APPEARANCE



The Wedge-Bolt anchor has a finished hex washer head that provides an attractive appearance. They are safer than traditional mechanical anchors where exposed thread above the nut creates a tripping hazard.

EASY TO READ LENGTH IDENTIFICATION

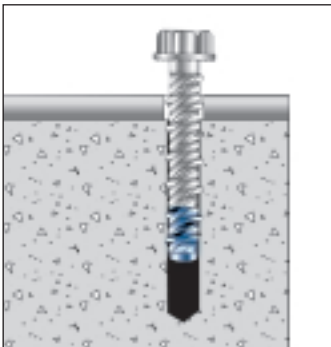


The Wedge-Bolt anchor has both the diameter and length clearly stamped on the head. Inspection is easy since there are no complicated letter codes to memorize.

PRODUCT SUBMITTAL (Wedge-Bolt)

REMOVABLE AND RE-USABLE

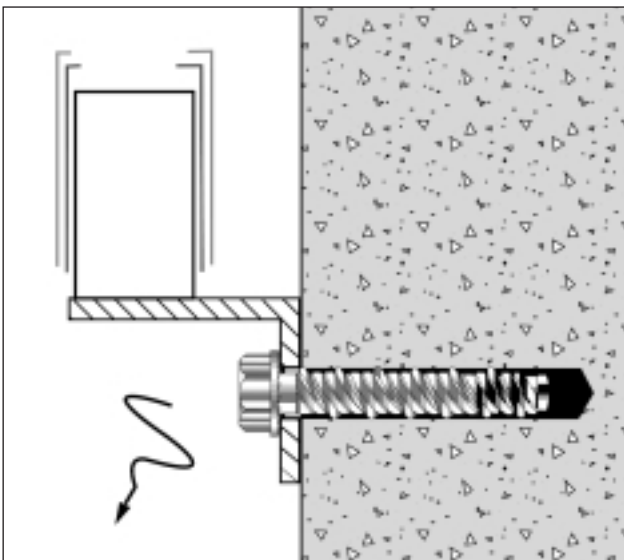
The Wedge-Bolt anchor is easy to remove, leaving a neat clean hole. Unlike traditional anchor types, Wedge-Bolt anchors can be removed to correct installation errors such as improperly drilled or unclean anchor holes. Once removed, no components that will corrode remain in the base material. When re-used in the same anchor hole, advance the anchor with a handheld socket, locating the tracks cut into the wall of the anchor hole by the double lead thread during its original installation. Do not use an electric impact wrench when re-using in the same hole.



When re-used to pilot a new anchor hole, 1 or 2 additional applications or re-uses are possible. The high double lead thread should be checked for excessive wear. Base material conditions (hardness and density) will affect re-usability.

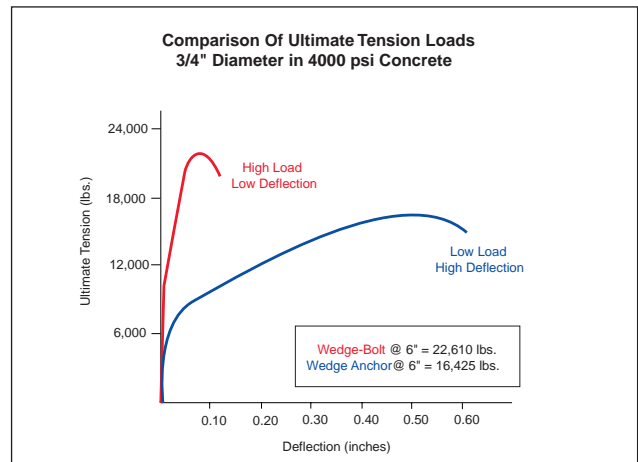
VIBRATION RESISTANT

The Wedge-Bolt anchor is vibration resistant. Unlike traditional anchors that have a small expansion mechanism, the double lead threads grip a large portion of the embedment length and there are no expansion forces to pulverize the concrete. For additional vibration resistance, the ratchet teeth on the underside of the hex washer head lock against the fixture. Factors of safety greater than 4 may be required to compensate for excessive vibration. The design professional in charge of the actual product installation should determine an appropriate factor of safety.



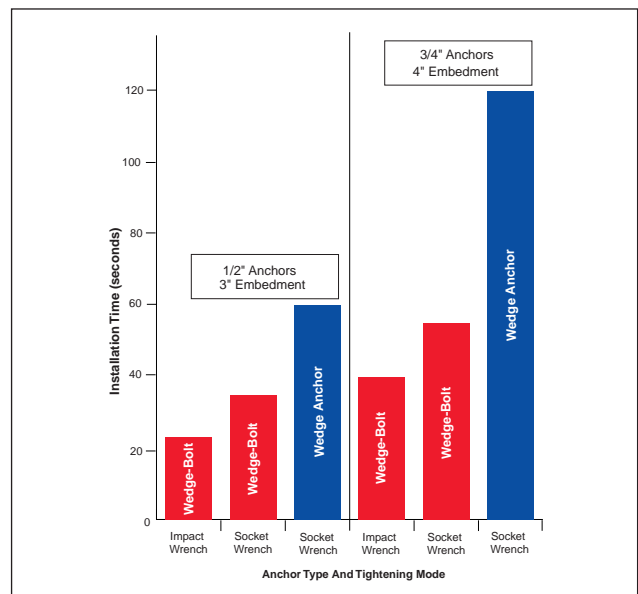
HIGH STRENGTH

The Wedge-Bolt anchor is typically stronger than a traditional wedge or sleeve type anchor. They have the low slip and close edge characteristics of adhesive anchors. A combination of a patented dual lead thread and high strength steel material provide excellent performance. High tension loads often allow the Wedge-Bolt to be used at a shallower embedment while high shear loads allow use of smaller diameters. Knowledge of an application's load requirements is the key to selecting a proper size and embedment depth.



COST EFFECTIVE

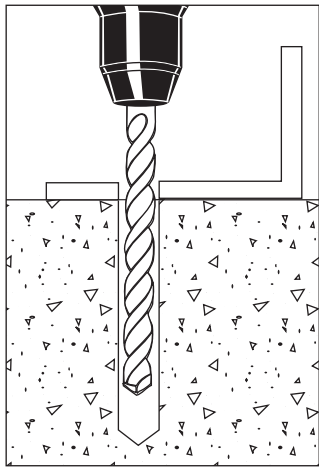
The Wedge-Bolt anchor saves time and money. It is faster to install and easier to use. This helps to increase productivity while reducing worker fatigue. Installation time is decreased up to 70%. For fast, easy, cost effective, high performance installations, the innovative Wedge-Bolt anchor is the one product that does it all.



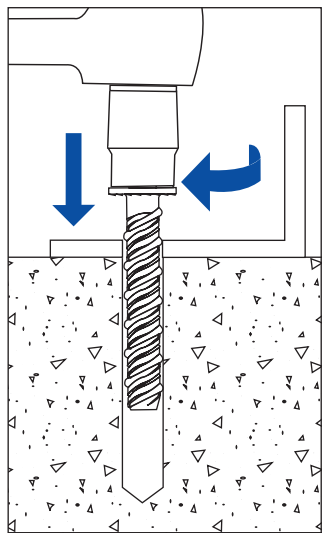
Note: Electric impact wrenches are available in different sizes (e.g. 1/2" drive or 3/4" drive) providing different torque capacities. Anchor size and base material conditions will determine the appropriate size electric impact wrench.

PRODUCT SUBMITTAL (Wedge-Bolt)

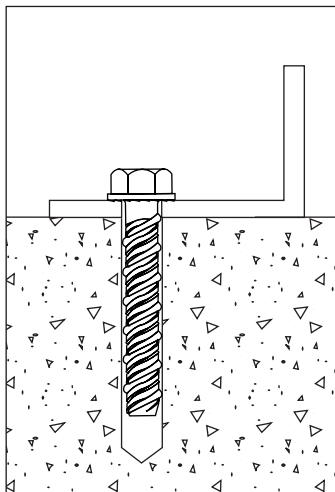
INSTALLATION PROCEDURE FOR BLUE-TIPPED WEDGE-BOLTS



Using the proper diameter **Wedge-Bit**, drill a hole into the base material to a depth of at least 1/2" or one anchor diameter deeper than the embedment required. Be sure to use a **Wedge-Bit**. Blow the hole clean of dust and other material. (When attaching to hollow base material, insert the appropriate Block Plug into the anchor hole).

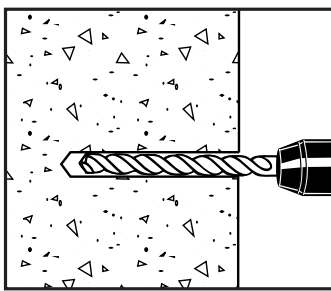


Insert the anchor through the fixture into the anchor hole. Begin tightening the anchor by rotating clockwise and applying pressure in toward the base material. This will engage the first few threads as the anchor begins to advance.

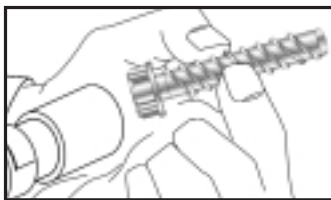


Continue tightening the anchor until the head is firmly seated against the fixture while achieving the required embedment depth. In extremely dense materials, use of an impact wrench is recommended.

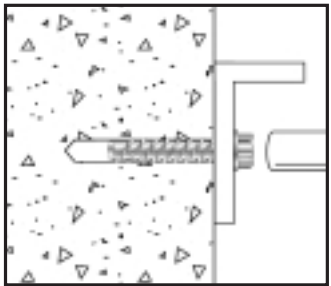
INSTALLATION PROCEDURES FOR 3/16" WEDGE-BOLT



Using a 3/16" diameter bit, drill a hole into the base material to a depth of at least 1/2" deeper than the embedment required. A **TAPPER** drill bit must be used. Blow the hole clean of dust and other material.



Using the Combo 3/16" Wedge-Bolt / **TAPPER** Tool and the appropriate driver, insert the head of the 3/16" Wedge-Bolt anchor. The drill motor should be set to "rotation only" mode.



Place the chamfered end of the 3/16" Wedge-Bolt through the fixture into the pre-drilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment. The driver will automatically disengage from the head of the Wedge-Bolt.

ANCHOR SIZES

The following tables list the sizes of hex head Wedge-Bolt anchors. The anchor length published is measured from below the hex washer head to the end of the anchor. To select the proper length, determine the embedment depth required to obtain the desired load capacity. Then add the thickness of the fixture, including any spacers or shims, to the embedment depth.

CARBON STEEL HEX HEAD WEDGE-BOLT

Wedge-Bolt anchors are manufactured from heat treated carbon steel that is plated with commercial bright zinc and a supplementary chromate treatment in accordance with ASTM Specification B 633, SC1, Type III (Fe / Zn 5).

CAT. NO.	SIZE	MIN. EMBED.	THREAD LENGTH	STD. BOX	STD. CTN.	WT./ 100
7000*	3/16" x 1-1/4"	1"	1-3/8"	100	500	1-3/4
7002*	3/16" x 1-3/4"	1"	1-5/8"	100	500	2-1/4
7004*	3/16" x 2-1/4"	1"	2"	100	500	2-1/2
7006*	3/16" x 2-3/4"	1"	2-1/2"	100	500	3
7204	1/4" x 1-1/4"	1"	1-1/8"	100	500	2-1/2
7206	1/4" x 1-3/4"	1"	1-5/8"	100	500	3-1/4
7208	1/4" x 2-1/4"	1"	2"	100	500	4-1/4
7210	1/4" x 3"	1"	2-3/4"	100	500	5-1/2
7220	3/8" x 1-3/4"	1-1/2"	1-1/2"	50	250	8
7222	3/8" x 2-1/2"	1-1/2"	2-1/4"	50	250	11
7224	3/8" x 3"	1-1/2"	2-3/4"	50	250	12
7226	3/8" x 4"	1-1/2"	3-3/4"	50	250	15
7240	1/2" x 2"	1-3/4"	1-3/4"	50	200	14

PRODUCT SUBMITTAL (Wedge-Bolt)

CAT. NO.	SIZE	MIN. EMBED.	THREAD LENGTH	STD. BOX	STD. CTN.	WT./ 100
7242	1/2" x 2-1/2"	1-3/4"	2-1/4"	50	200	15-1/2
7244	1/2" x 3"	1-3/4"	2-3/4"	50	150	21
7246	1/2" x 4"	1-3/4"	3-3/4"	50	150	25
7248	1/2" x 5"	1-3/4"	3-3/4"	25	100	28
7250	1/2" x 6"	1-3/4"	3-3/4"	25	75	34
7260	5/8" x 3"	2-1/2"	2-3/4"	25	100	28
7262	5/8" x 4"	2-1/2"	3-3/4"	25	100	30
7264	5/8" x 5"	2-1/2"	3-3/4"	25	75	39
7266	5/8" x 6"	2-1/2"	3-3/4"	25	75	47
7280	3/4" x 3"	2-1/2"	2-3/4"	20	60	48
7282	3/4" x 4"	2-1/2"	3-3/4"	20	60	56
7284	3/4" x 5"	2-1/2"	3-3/4"	20	60	70
7286	3/4" x 6"	2-1/2"	3-3/4"	20	60	86
7288	3/4" x 8"	2-1/2"	3-3/4"	10	40	100

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

* 3/16" Wedge-Bolt anchors do not have a Blue Tip. See separate section for appropriate 3/16" diameter carbide tipped drill bits.

CARBON STEEL PHILLIPS FLAT HEAD 3/16" WEDGE-BOLT						
CAT. NO.	SIZE	MIN. EMBED.	THREAD LENGTH	STD. BOX	STD. CTN.	WT./ 100
7100*	3/16" x 1-1/4"	1"	1"	100	500	1-1/4
7102*	3/16" x 1-3/4"	1"	1-1/2"	100	500	1-3/4
7104*	3/16" x 2-1/4"	1"	2"	100	500	2
7106*	3/16" x 2-3/4"	1"	2-1/2"	100	500	3-1/2

The published length is the overall length of the anchor.

* 3/16" Wedge-Bolt anchors do not have a Blue Tip. See separate section for appropriate 3/16" diameter carbide tipped drill bits.

WEDGE-BIT™ SIZES

For proper performance, all blue tipped Wedge-Bolt anchors must be installed with a blue Wedge-Bit. The Wedge-Bit has a special matched tolerance range designed to provide optimum performance for the anchor. The available shank styles and sizes are listed below.

WEDGE-BOLT TOLERANCES

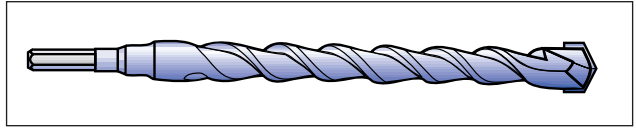
WEDGE-BOLT SIZE	BIT SIZE RANGE
1/4"	0.255" - 0.259"
3/8"	0.385" - 0.389"
1/2"	0.490" - 0.495"
5/8"	0.600" - 0.605"
3/4"	0.720" - 0.725"

SDS-PLUS WEDGE-BIT™



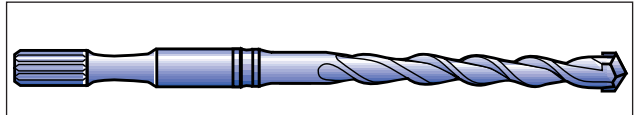
CAT. NO.	DRILL SIZE (IN.)	USABLE LENGTH (IN.)	OVERALL LENGTH (IN.)	STD. POUCH	WT./ DOZEN
1312	1/4	2	4	1	1
1314	1/4	4	6	1	1-1/4
1316	3/8	4	6	1	2
1318	3/8	6	8	1	2-1/2
1320	1/2	4	6	1	2-3/4
1322	1/2	8	10	1	4-1/4
1324	5/8	6	8	1	4-1/2
1326	5/8	10	12	1	6-1/4
1328	3/4	6	8	1	5
1330	3/4	10	12	1	6-3/4

HEAVY DUTY STRAIGHT SHANK WEDGE-BIT



CAT. NO.	DRILL SIZE (IN.)	USABLE LENGTH (IN.)	OVERALL LENGTH (IN.)	STD. POUCH	WT./ DOZEN
1370	1/4	2-3/4	4	1	1
1372	1/4	4	6	1	1-1/4
1380	3/8	4	6	1	2
1384	3/8	11	13	1	2-1/2
1390	1/2	4	6	1	2-3/4
1394	1/2	11	13	1	4-1/4
1396	5/8	11	13	1	6-1/4
1397	3/4	11	13	1	6-3/4

SPLINE WEDGE-BIT



CAT. NO.	DRILL SIZE (IN.)	USABLE LENGTH (IN.)	OVERALL LENGTH (IN.)	STD. TUBE	WT./ DOZEN
1340	1/2	8	13	1	11
1344	5/8	8	13	1	12-1/2
1348	3/4	8	13	1	15

SDS-MAX WEDGE-BIT

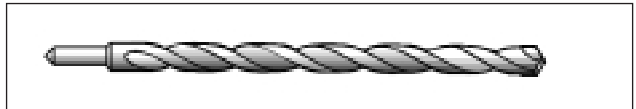


CAT. NO.	DRILL SIZE (IN.)	USABLE LENGTH (IN.)	OVERALL LENGTH (IN.)	STD. TUBE	WT./ DOZEN
1354	1/2	8	13	1	12
1356	5/8	8	13	1	13
1358	3/4	8	13	1	15

3/16" BITS FOR 3/16" WEDGE-BOLT

For proper performance all 3/16" Wedge Bolt anchors must be installed with a 3/16" diameter bit. Tolerance range = 0.202" to 0.204" for the available styles and sizes listed below.

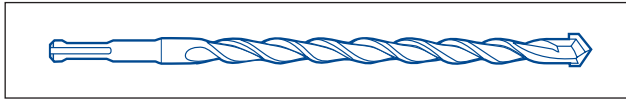
STRAIGHT SHANK TANGED WEDGE-BIT



CAT. NO.	DRILL SIZE (IN.)	USABLE LENGTH (IN.)	OVERALL LENGTH (IN.)	STD. TUBE	WT./ 10
2785	3/16	2	3-1/2	10	1/4
2786	3/16	3	4-1/2	10	1/4
2787	3/16	4	5-1/2	10	1/2
2788	3/16	5	6-1/2	10	1/2
2789	3/16	6	7-1/2	10	1/2

PRODUCT SUBMITTAL (Wedge-Bolt)

HEX SHANK SDS-PLUS WEDGE-BIT

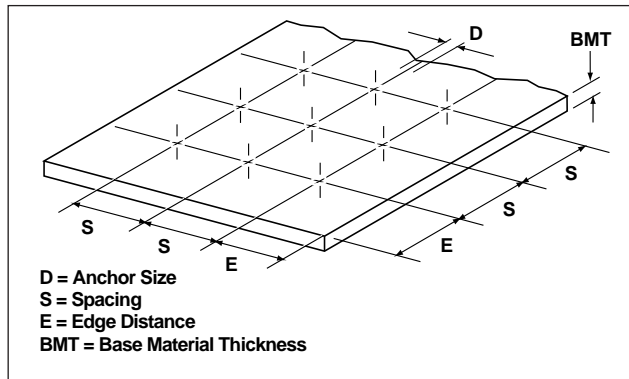


CAT. NO.	DRILL SIZE (IN.)	USABLE LENGTH (IN.)	OVERALL LENGTH (IN.)	STD. TUBE	WT./ 10
2796	3/16	3	5	1	1
2797	3/16	5	7	1	1

COMBO 3/16" WEDGE-BOLT / TAPPER INSTALLATION TOOL

CAT. NO.	DESCRIPTION	MAX. SCREW LENGTH	MAX. BIT LENGTH	STD. BOX	WT./ EACH
2791	Combo 3/16" Wedge-Bolt/TAPPER 1000 Tool	4"	5-1/2"	1	3/4

DESIGN CRITERIA



BASE MATERIAL THICKNESS

The minimum recommended thickness of solid base material, BMT, is 125% of the embedment to be used. For example, when installing an anchor to a depth of 4", the base material thickness should be 5".

SPACING BETWEEN ANCHORS

To obtain the maximum load in tension or shear, a spacing, S, of 10 anchor diameters (10D) or greater should be used. The minimum recommended anchor spacing, S, is 5 anchor diameters (5D) at which point the load should be reduced by 50%. Anchor spacing closer or less than 5 diameters (5D) needs to be field tested. Actual base material conditions will determine any applicable reduction factor. The following table lists the load reduction factor, Rs, for each anchor diameter, D, based on the center to center anchor spacing.

ANCHOR SIZE D	ANCHOR SPACING, S (INCHES) TENSION AND SHEAR					
	10D	9D	8D	7D	6D	5D
3/16	2-1/2	2-1/4	2 .	1-3/4	1-1/2	1-1/4
1/4	2-1/2	2-1/4	2 .	1-3/4	1-1/2	1-1/4
3/8	3-3/4	3-3/8	3 .	2-5/8	2-1/4	1-7/8
1/2	5	4-1/2	4 .	3-1/2	3	2-1/2
5/8	6-1/4	5-5/8	5 .	4-3/8	3-3/4	3-1/8
3/4	7-1/2	6-3/4	6 .	5-1/4	4-1/2	3-3/4
Rs	1.00	0.90	0.80	0.70	0.60	0.50

EDGE DISTANCE - TENSION

For tension loads, an edge distance, E, of 10 diameters (10D) or greater should be used to obtain the maximum tension load. The minimum recommended edge distance, E, is 3 diameters (3D) at which point the tension load should be

reduced by 28%. Edge distances closer or less than 3 diameters (3D) need to be field tested. Actual base material conditions will determine any applicable reduction factor. The following table lists the load reduction factor, Re, for each anchor diameter, D, based on the anchor center to edge distance.

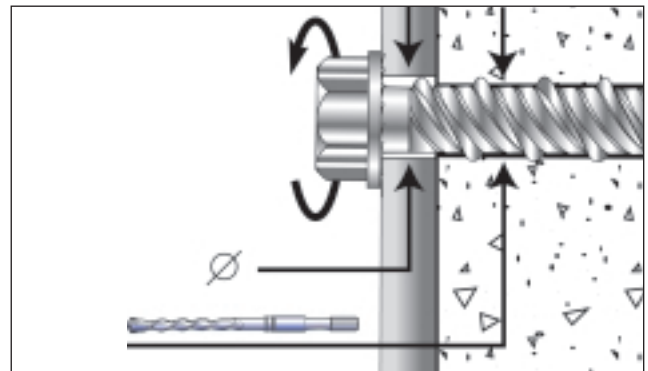
ANCHOR SIZE D	EDGE DISTANCE, E (INCHES) TENSION ONLY							
	10D	9D	8D	7D	6D	5D	4D	3D
3/16	2-1/2	2-1/4	2 .	1-3/4	1-1/2	1-1/4	1	3/4
1/4	2-1/2	2-1/4	2 .	1-3/4	1-1/2	1-1/4	1	3/4
3/8	3-3/4	3-3/8	3 .	2-5/8	2-1/4	1-7/8	1-1/2	1-1/8
1/2	5	4-1/2	4 .	3-1/2	3	2-1/2	2	1-1/2
5/8	6-1/4	5-5/8	5 .	4-3/8	3-3/4	3-1/8	2-1/2	1-7/8
3/4	7-1/2	6-3/4	6 .	5-1/4	4-1/2	3-3/4	7	2-1/4
Re	1.00	0.96	0.92	0.88	0.84	0.80	0.76	0.72

EDGE DISTANCE - SHEAR

For shear loads, an edge distance, E, of 10 anchor diameters (10D) or greater should be used to obtain the maximum load. The minimum recommended edge distance, E, is 3 anchor diameters (3D) at which point the shear load should be reduced by 84%. Edge distances closer or less than 3 diameters (3D) need to be field tested. Actual base material conditions will determine any applicable reduction factor. The following table lists the load reduction factor, Re, for each anchor diameter, D, based on the anchor center to edge distance.

ANCHOR SIZE D	EDGE DISTANCE, E (INCHES) SHEAR ONLY							
	10D	9D	8D	7D	6D	5D	4D	3D
3/16	2-1/2	2-1/4	2 .	1-3/4	1-1/2	1-1/4	1	3/4
1/4	2-1/2	2-1/4	2 .	1-3/4	1-1/2	1-1/4	1	3/4
3/8	3-3/4	3-3/8	3 .	2-5/8	2-1/4	1-7/8	1-1/2	1-1/8
1/2	5	4-1/2	4 .	3-1/2	3	2-1/2	2	1-1/2
5/8	6-1/4	5-5/8	5 .	4-3/8	3-3/4	3-1/8	2-1/2	1-7/8
3/4	7-1/2	6-3/4	6 .	5-1/4	4-1/2	3-3/4	3	2-1/4
Re	1.00	0.88	0.76	0.64	0.52	0.40	0.28	0.16

INSTALLATION SPECIFICATIONS



CARBON STEEL WEDGE-BOLT

ANCHOR SIZE	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"
Wedge-Bit/Drill Bit Size	**3/16"	*1/4"	*3/8"	*1/2"	*5/8"	*3/4"
Fixture Clearance Hole	**5/16"	5/16"	7/16"	9/16"	11/16"	13/16"
Head Washer Height	7/32"	21/64"	7/16"	7/16"	1/2"	19/32"
Washer O.D.	9/16"	47/64"	1"	1-3/16"	1-13/32"	
Wrench Size	7/16"	9/16"	3/4"	15/16"	1-1/8"	

* For proper performance, a Wedge-Bit must be used.

** Same 3/16" standard bit used for 1/4" TAPPER is packaged with each box of 3/16" Wedge-Bolt anchors.

PRODUCT SUBMITTAL (Wedge-Bolt)

ANSI DRILL BIT REDUCTION FACTORS

For proper performance, the Wedge-Bolt anchor should be installed with a Wedge-Bit. The Wedge-Bit has a special matched tolerance range designed to provide maximum pullout with a minimum amount of installation torque. When Wedge-Bits cannot be used, corresponding ANSI drill bits may be substituted. Load reduction factors must be applied to both the 1/4" and 3/8" sizes and the installation torque on the 1/2", 5/8" and 3/4" sizes is increased when standard ANSI drill bits are used. Below please find the appropriate cross-reference of ANSI to Wedge-Bit dimensions with the load reduction factors noted accordingly.

WEDGE-BOLT DIAMETER	WEDGE-BIT	ANSI	ANSI LOAD REDUCTION	INSTALLATION TORQUE
1/4	1/4	1/4	20%	-
3/8	3/8	3/8	15%	-
1/2	1/2	7/16	0	++
5/8	5/8	9/16	0	+
3/4	3/4	11/16	0	+

No reduction factor is required when Wedge-Nits are used with Wedge-Bolts. Also when installing larger diameter Wedge-Bolts with ANSI bits, an electric impact wrench is recommended. The amount of torque increase is variable and is a function of both the hardness of aggregate and density of concrete. The amount of increase is either slight(+) to significant(++) based on these factors.

MAXIMUM CLAMPING TORQUE

Wedge-Bolt anchors achieve their load capacity by the thread undercutting the base material. It is not necessary to tighten the anchor to any special torque value.

The amount of torque needed to advance the anchor will vary due to actual base material conditions (e.g., aggregate size, type, hardness, density, etc.) While the Wedge-Bolt anchor does not require any specific installation torque, some installers may request a maximum clamping torque. This is the maximum permissible torque value to be used to clamp the fixture to the base material. The values listed below should be used as guidelines. Their purpose is to prevent the anchor from stripping out when too much torque is applied. However, certain base material conditions will allow for higher clamping torque values.

MAXIMUM CLAMPING TORQUE (FT. - LBS.)

BASE MATERIAL	3/16"	1/4"	ANCHOR DIAMETER 3/8"	1/2"	5/8"	3/4"
2,000 psi Concrete	5	5	40	60	75	150
4,000 psi Concrete	10	10	40	60	75	250
6,000 psi Concrete	10	10	40	60	75	250
4,000 psi Lightweight	10	10	15	40	60	70
Grout Filled Block	10	10	15	40	60	70
Solid Red Brick	10	10	30	60	80	100
Hollow Block	5	5	10	-	-	-

MATERIAL SPECIFICATIONS

CARBON STEEL WEDGE-BOLT

ANCHOR COMPONENT	COMPONENT MATERIAL
Anchor Body	Through Hardened AISI 1020 / 1040 Carbon Steel
Zinc Plating	ASTM B 633, SC1, Type III (Fe/Zn 5)

PERFORMANCE DATA

The following load capacities are based on testing conducted according to ASTM Standard E 488.

ULTIMATE LOAD CAPACITIES IN CONCRETE

ANCHOR SIZE	EMBED. DEPTH	2,000 PSI TENSION (LBS.)	CONCRETE SHEAR (LBS.)	4,000 PSI TENSION (LBS.)	CONCRETE SHEAR (LBS.)	6,000 PSI TENSION (LBS.)	CONCRETE SHEAR (LBS.)
1/4"	1"	920	1,030	1,550	2,090	1,650	2,440
1/4"	1-1/2"	1,860	2,580	2,360	2,690	2,480	2,690
1/4"	2"	2,800	2,780	4,230	2,780	4,980	3,360
1/4"	2-1/2"	3,870	3,080	4,900	3,080	5,260	3,660
1/4"	3"	4,940	3,080	5,880	3,080	6,480	3,660
3/8"	1-1/2"	2,140	3,600	2,660	4,870	3,030	7,340
3/8"	2"	3,300	4,915	4,105	4,990	5,185	7,340
3/8"	2-1/2"	4,460	5,110	5,550	5,110	7,340	7,340
3/8"	3"	6,180	6,275	7,970	6,275	9,890	7,475
3/8"	3-1/2"	7,900	7,290	10,390	7,440	12,440	7,610
1/2"	1-3/4"	3,055	6,400	3,860	7,300	4,620	8,900
1/2"	2"	3,625	6,570	3,930	7,420	4,780	9,000
1/2"	2-1/2"	4,770	7,420	6,165	8,075	7,075	9,130
1/2"	3"	5,910	7,700	8,400	8,730	9,960	9,260
1/2"	3-1/2"	6,765	8,650	11,110	9,430	11,890	9,430
1/2"	4"	7,620	8,650	13,820	9,600	14,580	9,600
5/8"	2-1/2"	4,950	7,790	6,800	11,320	8,240	13,610
5/8"	3"	6,800	10,075	9,100	12,740	10,820	14,305
5/8"	3-1/2"	8,650	12,360	11,400	14,160	13,600	15,000
5/8"	4"	10,245	13,735	13,675	15,400	15,880	15,920
5/8"	5"	13,440	16,480	18,220	17,750	20,850	17,750
3/4"	2-1/2"	4,050	10,800	6,100	14,000	8,480	17,000
3/4"	3"	5,880	12,270	9,085	15,500	11,390	18,770
3/4"	3-1/2"	7,655	13,945	12,570	19,255	14,345	20,795
3/4"	4"	9,430	15,620	14,800	22,820	17,300	22,820
3/4"	5"	13,500	21,825	18,705	26,780	21,525	27,500
3/4"	6"	17,570	28,030	22,610	30,550	25,750	32,180

NOTE: The values listed above are ultimate load capacities in pounds which should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load.

PRODUCT SUBMITTAL (Wedge-Bolt)

ULTIMATE LOAD CAPACITIES IN CONCRETE - 3/16" WEDGE-BOLT

The following load capacities are based on testing conducted according to ASTM Standard E 488.

ANCHOR SIZE	EMBED. DEPTH	2,000 PSI CONCRETE		3,000 PSI CONCRETE	
		TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)
3/16"	1"	660	1,300	800	1,465
945	1,630	1,090	1,800	1,250	1,920
3/16"	1-1/8"	775	1,485	970	1,590
1,170	1,700	1,370	1,810	1,475	1,920
3/16"	1-1/4"	895	1,675	1,155	1,725
1,385	1,775	1,650	1,825	1,700	1,930
3/16"	1-3/8"	1,010	1,840	1,315	1,840
1,620	1,840	1,930	1,840	1,930	1,930
3/16"	1-1/2"	1,130	1,955	1,465	1,955
1,800	1,955	2,140	1,955	2,140	2,025
3/16"	1-5/8"	1,345	2,075	1,680	2,075
2,015	2,075	2,355	2,075	2,355	2,120
3/16"	1-3/4"	1,560	2,165	1,895	2,175
2,230	2,185	2,570	2,195	2,570	2,200
3/16"	1-7/8"	1,775	2,220	-	-
-	-	-	-	-	-
3/16"	2"	1,990	2,280	-	-
-	-	-	-	-	-

Ultimate load values should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load. All anchors were installed in holes drilled with 3/16" diameter (TAPPER) drill bits that have a tolerance range of 0.202" to 0.204". All anchors were installed using the TAPPER 1000 Installation (Combo Kit) Tool - Catalog Number 2791. **To avoid installation problems in denser concrete base materials having compressive strengths over 2,000 psi, select an anchor length that results in an embedment depth that does not exceed 1-3/4".**

ULTIMATE LOAD CAPACITIES IN LIGHTWEIGHT CONCRETE

ANCHOR SIZE	EMBED. DEPTH	4,000 PSI LIGHTWEIGHT CONCRETE	
		TENSION (LBS)	SHEAR (LBS)
1/4"	1"	1,080	1,640
1/4"	2"	2,630	1,880
3/8"	1-1/2"	2,160	4,260
3/8"	3-1/2"	6,510	5,480
1/2"	2-1/2"	3,880	7,200
1/2"	4"	7,830	8,230
5/8"	3"	5,940	10,640
5/8"	4"	8,930	12,960
3/4"	3"	7,260	13,600
3/4"	5"	14,970	17,220

NOTE: The values listed above are ultimate load capacities which should be reduced by a safety factor of 4 or greater to determine the allowable working load.

The following tables list the ultimate or failure load for the Wedge-Bolt anchor when installed in grout filled block or solid red brick. These values should be used as a guide since the consistency of walls constructed from these materials varies widely. Job site tests should be conducted to determine site specific values.

ULTIMATE LOAD CAPACITIES FOR GROUT FILLED C-90 BLOCK

ANCHOR SIZE	EMBED. DEPTH	GROUT FILLED BLOCK	
		TENSION (LBS)	SHEAR (LBS)
1/4"	2-1/2"	2,280	1,480
3/8"	3-1/2"	3,390	3,830
1/2"	4"	4,800	7,060
5/8"	4"	6,120	11,250
3/4"	4"	6,580	12,340

NOTE: Depending upon anchor application and governing building code, ultimate load capacities should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load. The design professional familiar with the actual product installation should be consulted. The consistency of grout filled masonry varies greatly. The load capacities listed above should be used as guidelines only. Job site tests should be conducted to verify base material consistency and actual anchor performance.

ULTIMATE LOAD CAPACITIES FOR GROUT FILLED C-90 BLOCK

ANCHOR SIZE	EMBED. DEPTH	GROUT FILLED BLOCK	
		TENSION (LBS)	SHEAR (LBS)
3/16"	1-1/4"	2,095	2,160
3/16"	1-1/2"	3,140	2,160
3/16"	1-7/8"	3,400	2,160
3/16"	2-1/4"	3,485	2,160

Depending upon anchor application and governing building code, ultimate load values in masonry base materials should be reduced by a minimum safety factor of either 4 or greater to determine the allowable working load. The design professional familiar with the actual product installation should be consulted. All anchors were installed in holes drilled with 3/16" diameter (TAPPER) drill bits that have a tolerance range of 0.202" to 0.204". All anchors were installed using the TAPPER 1000 Installation (Combo Kit) Tool - Catalog Number 2791. Since the consistency of masonry base materials varies greatly, the load capacities shown should be used as guidelines only. Job site tests should be conducted to determine installation success rate and actual load capacities.

ULTIMATE LOAD CAPACITIES FOR SOLID RED BRICK

ANCHOR SIZE	EMBED. DEPTH	SOLID RED BRICK	
		TENSION (LBS)	SHEAR (LBS)
1/4"	2-1/2"	2,280	1,480
3/8"	3-1/2"	3,390	3,830
1/2"	4"	4,800	7,060
5/8"	4"	6,120	11,250
3/4"	4"	6,580	12,340

NOTE: Depending upon anchor application and governing building code, ultimate load capacities should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load. The design professional familiar with the actual product installation should be consulted. Please refer to the general section entitled Evaluation of Test Data that appears earlier in this manual for current industry standards. The consistency of solid red brick varies greatly. The load capacities listed above should be used as guidelines only. Job site tests should be conducted to verify base material consistency and actual anchor performance.

ULTIMATE LOAD CAPACITIES FOR SOLID RED BRICK

ANCHOR SIZE	EMBED. DEPTH	SOLID RED BRICK	
		TENSION (LBS)	SHEAR (LBS)
3/16"	1-1/4"	770	1,310
3/16"	1-1/2"	950	1,310
3/16"	1-7/8"	1,450	1,310
3/16"	2-1/4"	1,920	1,310

ULTIMATE LOAD CAPACITIES FOR ASTM C-90 HOLLOW BLOCK

ANCHOR SIZE	EMBED. DEPTH	ASTM C-90 HOLLOW BLOCK	
		TENSION (LBS)	SHEAR (LBS)
3/16"	1-1/4"	1,140	1,840

ULTIMATE LOAD CAPACITIES FOR "FLORIDA" HOLLOW BLOCK

ANCHOR SIZE	EMBED. DEPTH	"FLORIDA" HOLLOW BLOCK	
		TENSION (LBS)	SHEAR (LBS)
3/16"	1-1/4"	1,160	1,475

NOTE: Depending upon anchor application and governing building code, ultimate load values in masonry base materials should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load. The design professional familiar with the actual product installation should be consulted. All anchors were installed in holes drilled with 3/16" diameter (TAPPER) drill bits that have a tolerance range of 0.202" to 0.204". All anchors were installed using the TAPPER 1000 Installation (Combo Kit) Tool - Catalog Number 2791 with the exception of those installed in "Florida" Hollow Block. Anchors used in extremely soft base materials should be manually installed with a hand held socket or screwdriver. Since the consistency of masonry base materials varies greatly, the load capacities shown should be used as guidelines only. Job site tests should be conducted to determine installation success rate and actual load capacities.

PRODUCT SUBMITTAL (Wedge-Bolt)



ICBO Evaluation Service, Inc.

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American National Standards Institute

EVALUATION REPORT

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ER-5788

Issued August 1, 2000

Filing Category: FASTENERS—Concrete and Masonry Anchors (066)

POWERS WEDGE-BOLT ANCHOR

POWERS FASTENERS, INC.

2 POWERS SQUARE

NEW ROCHELLE, NEW YORK 10801

1.0 SUBJECT

Powers Wedge-Bolt Anchor.

2.0 DESCRIPTION

2.1 General:

The Powers Wedge-Bolt is a concrete screw anchor manufactured from heat-treated carbon steel complying with AISI 1020/1040 designed for use in normal-weight concrete. The anchor is formed with a hex head, an integral washer, a dual lead thread, and a chamfered tip, and is zinc plated. The Wedge-Bolt anchor is available in nominal diameters ranging from $1/4$ to $3/4$ inch (6.4 to 19.1 mm), in various lengths.

2.2 Installation:

A pilot hole is predrilled using a carbide-tipped Wedge-Bit, supplied by Powers Fasteners, with bit diameter matched to the anchor size. The drill bit size range corresponding to each anchor size is shown in Table 4. The hole must be drilled to a minimum depth $1/2$ inch (12.7 mm) deeper than the required embedment. After the dust is removed from the drilled hole, the Wedge-Bolt anchor is installed per the manufacturer's instructions to the specified embedment depth.

2.3 Design:

The allowable tension and shear loads are indicated in Tables 1 and 2. The allowable loads are based on the anchor spacing and edge distances as shown in Table 3. Allowable loads for anchors subjected to combined shear and tension loads are determined by the following equation:

$$(P_s/P_t) + (V_s/V_t) \leq 1$$

where:

P_s = Applied tension load.

P_t = Allowable tension load in Table 1.

V_s = Applied shear load.

V_t = Allowable shear load in Table 2.

2.4 Special Inspection:

Where special inspection is required under Section 1701 of the *Uniform Building Code*™ (UBC), as noted in Tables 1 and 2 of this report, the inspector must be on the jobsite continuously during anchor installation to verify the screw anchor type, dimensions, concrete type and compressive strength, drill bit size, hole dimensions, screw anchor spacing and edge distance, slab thickness, and anchor embedment.

2.5 Identification:

The Powers Wedge-Bolt anchor head is marked with anchor diameter and length as noted in Figure 1. Each package contains a label bearing the manufacturer's name (Powers Fasteners, Inc.) and address, the anchor type and size, and the evaluation report number (ICBO ES ER-5788).

3.0 EVIDENCE SUBMITTED

Reports of load tests, and installation instructions.

4.0 FINDINGS

The Powers Wedge-Bolt Anchor described in this report complies with the 1997 *Uniform Building Code*™, subject to the following conditions:

- 4.1 The Wedge-Bolt anchor is installed in accordance with this report and the manufacturer's instructions.
- 4.2 Wedge-Bolt anchor sizes and dimensions, and allowable loads, are as set forth in this report.
- 4.3 Calculations demonstrating that the applied loads comply with this report must be submitted to the building official for approval.
- 4.4 The Wedge-Bolt anchors are limited to nonfire-resistant construction unless substantiating data, demonstrating that the anchor performance is maintained in fire-resistant situations, are submitted to the building official for approval.
- 4.5 Special inspection, when required, is provided in accordance with Section 2.4 of this report.
- 4.6 When the Wedge-Bolt anchors are installed without special inspection, the installer must certify to the building official that the screw anchors were installed in accordance with this report and the manufacturer's instructions.
- 4.7 Wedge-Bolt anchors are not subjected to vibratory or shock loads, such as those encountered by supports for reciprocating engines or crane rails, unless adequacy is determined to the building official's satisfaction.
- 4.8 The allowable tension loads in Table 1 may be adjusted in accordance with Section 1612.3 of the code for short-term loading due to seismic or wind forces.
- 4.9 Anchors are manufactured by Powers Fasteners, Inc., Two Powers Square, New Rochelle, New York, with quality control inspections by CEL Consulting (AA-639).

This report is subject to re-examination in one year.

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PRODUCT SUBMITTAL (Wedge-Bolt)

TABLE 1—ALLOWABLE TENSION VALUES FOR WEDGE-BOLT ANCHORS INSTALLED IN NORMAL-WEIGHT CONCRETE (pounds)^{1,2,3,4}

ANCHOR DIAMETER (inch)	MINIMUM EMBEDMENT (inches)	WITH SPECIAL INSPECTION					WITHOUT SPECIAL INSPECTION				
		Concrete Strength, f_c					Concrete Strength, f_c				
		2,000 psi	3,000 psi	4,000 psi	5,000 psi	6,000 psi	2,000 psi	3,000 psi	4,000 psi	5,000 psi	6,000 psi
1/4	1	230	305	380	400	415	115	155	190	200	205
	1 1/2	440	515	590	605	620	220	260	295	305	310
	2	700	880	1,060	1,155	1,245	350	440	530	580	625
	2 1/2	1,055	1,140	1,225	1,270	1,315	530	575	615	640	660
3/8	1 1/2	535	600	665	715	760	270	305	335	360	380
	2	825	930	1,030	1,165	1,300	415	465	515	585	650
	2 1/2	1,115	1,255	1,390	1,615	1,835	560	630	695	810	920
	3	1,545	1,770	1,995	2,235	2,475	775	890	1,000	1,120	1,240
	3 1/2	1,975	2,290	2,600	2,855	3,110	990	1,145	1,300	1,430	1,555
1/2	2	740	865	985	1,090	1,195	370	430	490	545	600
	2 1/2	1,025	1,165	1,300	1,460	1,620	515	585	650	730	810
	3	1,360	1,655	1,950	2,150	2,345	680	830	975	1,075	1,170
	3 1/2	1,515	1,820	2,120	2,550	2,975	760	910	1,060	1,275	1,485
	4	1,905	2,610	3,315	3,315	3,315	955	1,305	1,660	1,660	1,660
5/8	2 1/2	855	1,020	1,180	1,455	1,725	430	510	590	730	865
	3	1,140	1,495	1,845	2,045	2,240	570	750	925	1,025	1,120
	4	2,070	2,630	3,190	3,385	3,580	1,035	1,315	1,595	1,695	1,790
	5	3,360	3,960	4,555	4,885	5,215	1,680	1,980	2,280	2,445	2,610
3/4	3	1,080	1,350	1,620	2,095	2,565	540	675	810	1,050	1,285
	4	1,800	2,420	3,035	3,270	3,505	900	1,210	1,520	1,635	1,755
	5	3,100	3,440	3,780	4,315	4,850	1,550	1,720	1,890	2,160	2,425
	6	4,395	4,460	4,520	5,355	6,190	2,200	2,230	2,260	2,680	3,095

For **SI**: 1 inch = 25.4 mm, 1 pound = 4.44 N, 1 psi = 6.89 kPa.

¹The tabulated tension values are for anchors installed in normal-weight concrete having reached the designated ultimate compressive strength at time of installation. Linear interpolation may be used for concrete strengths between those listed.

² Spacing and edge distance shall be in accordance with Table 3.

³Allowable tension loads may be interpolated between concrete strengths or embedment depths. Extrapolation is not permitted.

⁴The allowable tension loads may be adjusted in accordance with Section 1612.3 of the code for short-term loading due to seismic or wind forces.

PRODUCT SUBMITTAL (Wedge-Bolt)

**TABLE 2—ALLOWABLE SHEAR VALUES FOR WEDGE-BOLT ANCHORS
INSTALLED IN NORMAL-WEIGHT CONCRETE (pounds)^{1,2,3}**

NOMINAL ANCHOR DIAMETER (inch)	MINIMUM EMBEDMENT (inches)	WITH OR WITHOUT SPECIAL INSPECTION				
		Concrete Strength, f'_c				
		2,000 psi	3,000 psi	4,000 psi	5,000 psi	6,000 psi
1/4	1	260	395	525	570	610
	1 1/2	645	670	695	685	675
	2	695	695	695	770	840
	2 1/2	770	770	770	845	915
3/8	1 1/2	900	1,015	1,130	1,485	1,835
	2	1,130	1,130	1,130	1,485	1,835
	2 1/2	1,130	1,130	1,130	1,485	1,835
	3	1,495	1,495	1,495	1,685	1,870
	3 1/2	1,715	1,790	1,860	1,885	1,905
1/2	2	1,510	1,685	1,855	2,055	2,250
	2 1/2	1,855	1,925	1,995	2,155	2,315
	3	1,925	2,055	2,185	2,250	2,315
	3 1/2	2,165	2,220	2,270	2,335	2,400
	4	2,165	2,220	2,270	2,335	2,400
5/8	2 1/2	1,950	2,390	2,830	3,120	3,405
	3	2,520	2,855	3,185	3,380	3,575
	4	3,435	3,645	3,850	3,915	3,980
	5	4,120	4,280	4,440	4,440	4,440
3/4	3	3,070	3,475	3,875	4,285	4,695
	4	3,905	4,805	5,705	5,705	5,705
	5	5,460	6,065	6,675	6,775	6,875
	6	7,010	7,325	7,640	7,845	8,045

For **SI**: 1 inch = 25.4 mm, 1 pound = 4.44 N, 1 psi = 6.90 kPa.

¹The tabulated shear values are for anchors installed in normal-weight concrete having reached the designated ultimate compressive strength at the time of installation.

²Spacing and edge distance shall be in accordance with Table 3.

³The allowable shear loads are recognized for short-term loading due to seismic or wind forces. However, no increase is permitted and the maximum load permitted for this application shall be that at a 1:5.6 diameter-to-embedment ratio. The maximum load at the 1:5.6 ratio is determined from interpolation between embedment depths for each anchor size. Extrapolation is not permitted.

PRODUCT SUBMITTAL (Wedge-Bolt)

TABLE 3—WEDGE-BOLT ANCHORS ALLOWABLE SPACING AND EDGE DISTANCES (inches)

PARAMETER	DISTANCE FOR FULL ANCHOR CAPACITY (Critical Distance) ¹	DISTANCE FOR REDUCED ANCHOR CAPACITY (Minimum Distance) ²	REDUCTION FACTOR ³
Spacing between anchors	12D	6D	0.50
Edge distance—tension	6D	3D	0.50
Edge distance—shear	12D	3D	0.17

For SI: 1 inch = 25.4 mm.

¹The listed values are the minimum distances required to obtain the load values listed in Tables 1 and 2. D = nominal anchor diameter. When adjacent anchors are different sizes or embedments, use the largest value for D .

²The listed values are the minimum distances at which the anchor can be set, when load values are adjusted appropriately.

³Load values in the tables are multiplied by the reduction factor when anchors are installed at the minimum spacing listed. Use linear interpolation for spacing between critical and minimum distances. Multiple reduction factors for more than one spacing or edge distance shall be calculated separately and multiplied.

TABLE 4—DRILL BIT SIZES

NOMINAL ANCHOR SIZE (inch)	BIT SIZE RANGE (inch)
1/4	0.255 - 0.259
3/8	0.385 - 0.389
1/2	0.490 - 0.495
5/8	0.600 - 0.605
3/4	0.720 - 0.725

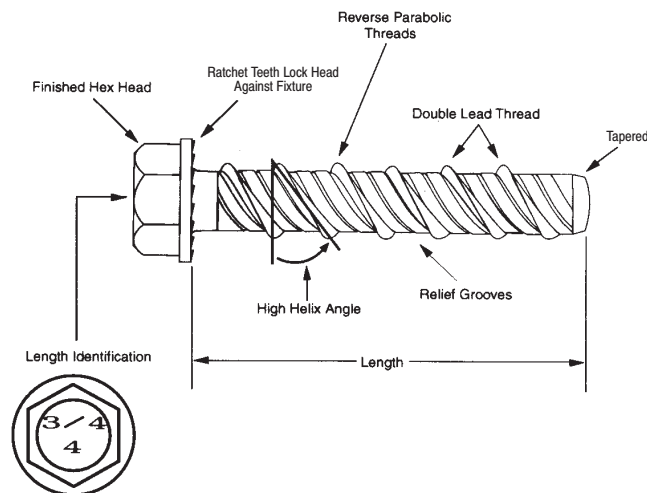


FIGURE 1—POWERS WEDGE-BOLT ANCHOR DESCRIPTION AND HEAD MARKINGS

PRODUCT SUBMITTAL (Wedge-Bolt)



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a Participating Member of the NES, Inc.

Evaluation Reports are the opinion of the Committee on Evaluation, based on the findings, and do not constitute or imply an approval or acceptance by any local community. The Committee, in review of the data submitted, finds that in their opinion the product, material, system, or method of construction specifically identified in this report conforms with or is a suitable alternate to that specified in the Standard and International Codes, **SUBJECT TO THE LIMITATIONS IN THIS REPORT.**

The Committee on Evaluation has reviewed the data submitted for compliance with the *Standard Building Code*®, the *SBCCI Standard for Hurricane Resistant Residential Construction*® SSTD 1, and the *International One and Two Family Dwelling Code* and submits to the Building Official or other authority having jurisdiction the following report. The Committee on Evaluation, SBCCI PST & ESI and its staff are not responsible for any errors or omissions to any documents, calculations, drawings, specifications, tests or summaries prepared and submitted by the design professional or preparer of record that are listed in the Substantiating Data Section of this report. Copyrighted © 2001 SBCCI PST & ESI

REPORT NO.: 2124

EXPIRES: See current SBCCI PST & ESI EVALUATION REPORT LISTING

CATEGORY: FASTENERS

SUBMITTED BY:

**POWERS FASTENERS, INC.
2 POWERS SQUARE
NEW ROCHELLE, NEW YORK 10801**

1. PRODUCT TRADE NAME

Powers Wedge-Bolt Anchor

2. SCOPE OF EVALUATION

Structural

3. USES

Powers Wedge-Bolt Anchors are used for fastening into normal weight concrete.

4. DESCRIPTION

The Powers Wedge-Bolt Anchor is a one-piece unit featuring a finished hex head formed with an integral washer, dual lead thread, and a chamfered tip. It is available in $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{5}{8}$ ", and $\frac{3}{4}$ " (6, 10, 13, and 19 mm) diameters. They are self-

tapping screw-type anchors designed to be installed with a special bit (Wedge-Bit) matched to the diameter of the anchor. Maximum allowable loads are as noted in Tables 1 and 2 of this report.

5. INSTALLATION

5.1 General

The size, type, minimum spacing, minimum edge distance, minimum embedment, and installation methods shall be in accordance with this report and the manufacturer's recommendations. The allowable loads shall be compared to the materials used in actual installations and shall always be equal to or less than the allowable loads for the materials used.

Anchors shall be installed in holes predrilled with a Wedge-Bit. The hole shall be drilled to a depth of at least $\frac{1}{2}$ inch (13 mm) or one anchor diameter, whichever is greater, deeper than the embedment required. The dust in the pilot hole is cleaned out before installation of the screw anchor.

Anchors shall not be installed before the concrete has developed its design strength.

For tension loads, the anchors are installed a minimum of 12 diameters on center with a minimum edge distance of 6 diameters for 100% anchor efficiency. Spacing and edge distance may be reduced to 6 diameter spacing and 3 diameter edge distance providing allowable loads are reduced 50%.

For shear loads, the anchors are installed a minimum of 12 diameters on center with a minimum edge distance of 12 diameters for 100% anchor efficiency. Spacing and edge distance may be reduced to 6 diameter spacing and 3 diameter edge distance providing allowable loads are reduced 83%.

Linear interpolation may be used for intermediate spacing and edge margins.

The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these instructions shall be available at all times on the job site during installation.

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The instructions within this report govern if there are any conflicts between the manufacturer's instructions and this report.

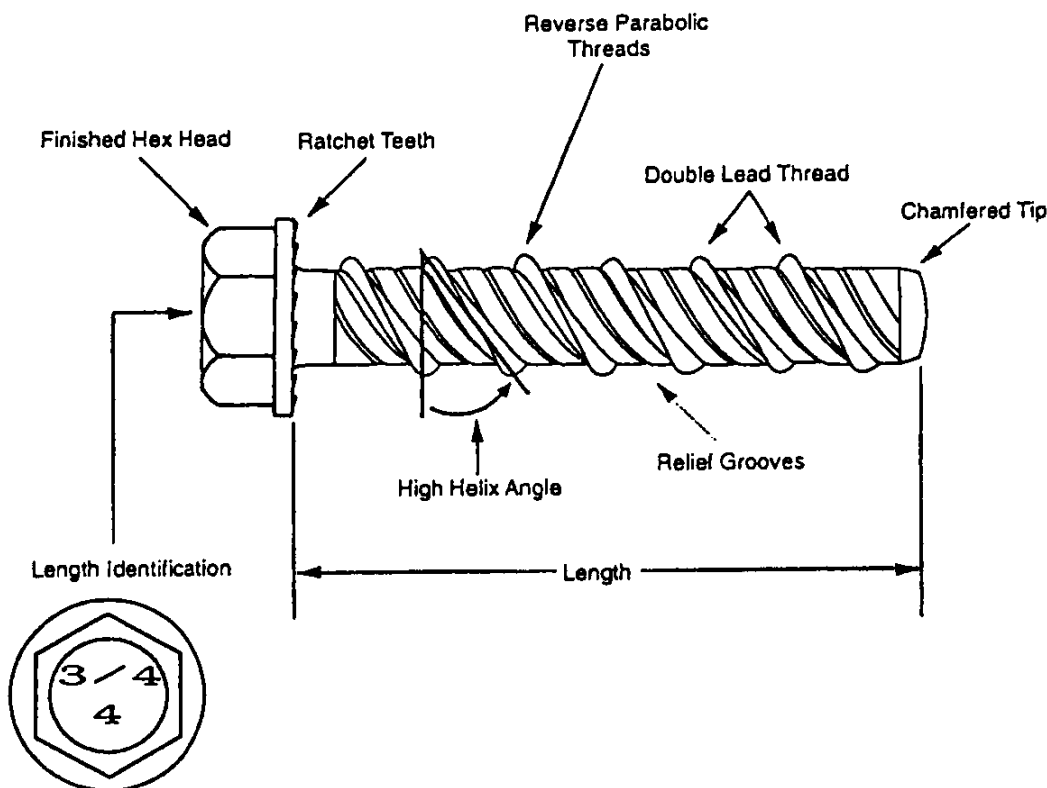
5.2 Special Inspection

When Special Inspection is required as noted in the design tables, the owner or the registered design professional in responsible charge acting as the owner's agent shall employ one or more special inspectors to provide inspection of the construction involved. The special inspector shall be a registered design professional, an SBCCI certified building inspector, and employee of an SBCCI PST & ESI or NES listed quality assurance or inspection agency, or other third party qualified person who demonstrates competence to the satisfaction of the building official.

Such inspection shall be of a nature as to determine that the construction and quality of work are in accordance with the contract drawings and specifications and the manufacturer's installation instructions.

Items to be verified by the special inspector include tightening torque, screw type, hole diameter, screw diameter, screw embedment, screw spacing, edge distances, concrete type, concrete compressive strength, slab thickness, grade of steel, and other requirements specified in this report and the manufacturer's instructions.

**FIGURE 1
POWERS WEDGE-BOLT ANCHOR**



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TABLE 1A
MAXIMUM ALLOWABLE TENSION VALUES^{1,3} (LBS)
WITH SPECIAL INSPECTION

ANCHOR DIAMETER (inches)	MINIMUM EMBEDMENT (inches)	CONCRETE STRENGTH, f'_c				
		2000 psi	3000 psi	4000 psi	5000 psi	6000 psi
1/4	1	230	305	380	400	415
	1½	440	515	590	605	620
	2	700	880	1060	1155	1245
	2½	1055	1140	1225	1270	1315
3/8	1½	535	600	665	715	760
	2	825	930	1030	1165	1300
	2½	1115	1255	1390	1615	1835
	3	1545	1770	1995	2235	2475
	3½	1975	2290	2600	2855	3110
1/2	2	740	865	985	1090	1195
	2½	1025	1165	1300	1460	1620
	3	1360	1655	1950	2150	2345
	3½	1515	1820	2120	2550	2975
	4	1905	2610	3315	3315	3315
5/8	2½	855	1020	1180	1455	1725
	3	1140	1495	1845	2045	2240
	4	2070	2630	3190	3385	3580
	5	3360	3960	4555	4885	5215
3/4	3	1080	1350	1620	2095	2565
	4	1800	2420	3035	3270	3505
	5	3100	3440	3780	4215	4850
	6	4395	4460	4520	5355	6190

SI: 1 inch = 25.4 mm, 1 psi = 6.895 kPa

- 1 The tabulated tension values are for anchors installed in normal weight concrete having reached the designated ultimate compressive strength at time of installation. Linear interpolation may be used for concrete strengths between those listed.
- 2 Spacing and edge distance shall be in accordance with Table 3 of this report.
- 3 The allowable tension loads may be increased $33\frac{1}{3}$ percent for short term loading due to seismic or wind forces.

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TABLE 1B
MAXIMUM ALLOWABLE TENSION VALUES³ (LBS)
WITHOUT SPECIAL INSPECTION

ANCHOR DIAMETER (Inches)	MINIMUM EMBEDMENT (Inches)	CONCRETE STRENGTH, f'_c				
		2000 psi	3000 psi	4000 psi	5000 psi	6000 psi
1/4	1	115	155	190	200	205
	1½	220	260	295	305	310
	2	350	440	530	580	625
	2½	530	575	615	640	660
3/8	1½	270	305	335	360	380
	2	415	465	515	585	650
	2½	560	630	695	810	920
	3	775	890	1000	1120	1240
	3½	990	1145	1300	1430	1555
1/2	2	370	430	490	545	600
	2½	515	585	650	730	810
	3	680	830	975	1075	1170
	3½	760	910	1060	1275	1485
	4	955	1305	1660	1660	1660
5/8	2½	430	510	590	730	865
	3	570	750	925	1025	1120
	4	1035	1315	1595	1695	1790
	5	1680	1980	2280	2445	2610
3/4	3	540	675	810	1050	1285
	4	900	1210	1520	1635	1755
	5	1550	1720	1890	2160	2425
	6	2200	2230	2260	2680	3095

SI: 1 inch = 25.4 mm, 1 psi = 6.895 kPa

- 1 The tabulated tension values are for anchors installed in normal weight concrete having reached the designated ultimate compressive strength at time of installation. Linear interpolation may be used for concrete strengths between those listed.
- 2 Spacing and edge distance shall be in accordance with Table 3 of this report.
- 3 The allowable tension loads may be increased $33\frac{1}{3}$ percent for short term loading due to seismic or wind forces.

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TABLE 2
MAXIMUM ALLOWABLE SHEAR VALUES^{1,2} (LBS)
WITH OR WITHOUT SPECIAL INSPECTION

ANCHOR DIAMETER (Inches)	MINIMUM EMBEDMENT (Inches)	CONCRETE STRENGTH, f'_c				
		2000 psi	3000 psi	4000 psi	5000 psi	6000 psi
1/4	1	260	395	525	570	610
	1½	645	670	695	685	675
	2	695	695	695	770	840
	2½	770	770	770	845	915
3/8	1½	900	1015	1130	1485	1835
	2	1130	1130	1130	1485	1835
	2½	1130	1130	1130	1485	1835
	3	1495	1495	1495	1685	1870
	3½	1715	1790	1860	1885	1905
1/2	2	1510	1685	1855	2055	2250
	2½	1855	1925	1995	2155	2315
	3	1925	2055	2185	2250	2315
	3½	2165	2220	2270	2335	2400
	4	2165	2220	2270	2335	2400
5/8	2½	1950	2390	2830	3120	3405
	3	2520	2855	3185	3380	3575
	4	3435	3645	3850	3915	3980
	5	4120	4280	4440	4440	4440
3/4	3	3070	3475	3875	4285	4695
	4	3905	4805	5705	5705	5705
	5	5460	6065	6675	6775	6875
	6	7010	7325	7640	7845	8045

SI: 1 inch = 25.4 mm, 1 psi = 6.895 kPa

- 1 The tabulated tension values are for anchors installed in normal weight concrete having reached the designated ultimate compressive strength at time of installation. Linear interpolation may be used for concrete strengths between those listed.
- 2 Spacing and edge distance shall be in accordance with Table 3 of this report.
- 3 The allowable shear loads may be increased $33\frac{1}{3}$ percent for short term loading due to seismic or wind forces.

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**TABLE 3
ALLOWABLE SPACING AND EDGE DISTANCE**

	DISTANCE FOR FULL ANCHOR CAPACITY (Critical Distance)	DISTANCE FOR REDUCED ANCHOR CAPACITY (Minimum Distance)	REDUCTION FACTOR ³
Spacing Between Anchors	12D	6D	0.50
Edge Distance - Tension	6D	3D	0.50
Edge Distance - Shear	12D	3D	0.17

- 1 The listed values are for the minimum distances required to obtain the load values listed in Tables 1 & 2 of this report. D = Anchor Diameter. When adjacent anchors are different sizes or embedments, use largest value for D.
- 2 The listed values are the minimum distances at which the anchor can be set, when load values are adjusted appropriately.
- 3 Load values in the tables are multiplied by the reduction factor when anchors are installed at the minimum spacing listed. Use linear interpolation for spacing between critical and minimum distances. Multiple reduction factors for more than one spacing or edged distance shall be calculated separately and multiplied.

6. SUBSTANTIATING DATA

- 6.1 Test report on Powers Wedge-Bolt Anchors in accordance with ASTM E 488, prepared by CEL Consulting, Report No. 0R72, dated January 21, 2000, signed and sealed by Lee Mattis, P.E.
- 6.2 Supplement test report on Powers Wedge-Bolt Anchors in accordance with ASTM E 488, prepared by CEL Consulting, Report No. 0R72 Supplement 0324, dated March 24, 2000, signed and sealed by Lee Mattis, P.E.
- 6.3 Test report on Seismic Qualification Testing of Powers Wedge-Bolt Anchors, prepared by CEL Consulting, Report No. 0R72S, dated May 10, 2000, signed and sealed by Lee Mattis, P.E.

7. CODE REFERENCES

Standard Building Code- 1999 Edition

Section 103.7 Alternate Materials and Methods
Chapter 17 Structural Tests and Inspections
Chapter 19 Concrete
Chapter 22 Steel

SBCCI Standard for Hurricane Resistant Residential Construction@SSTD 10-99

Section 101.4 Alternate Materials and Methods
Section 104 Design Criteria
Section 202.1.8 Fasteners and Connectors
Section 204.3.8 Fasteners and Connectors
Section 302.1 Fasteners and Connectors

International One and Two Family Dwelling Code - 1998 Edition

Section 108 Alternate Materials and Systems
Section 301 Design Criteria
Section 402.1.1 Fasteners
Section 402.2 Concrete
Table 402.2 Minimum Specified Compressive Strength of Concrete

8. COMMITTEE FINDINGS

The Committee on Evaluation in review of the data submitted finds that, in their opinion, the Powers Wedge-Bolt Anchor as described in this report conforms with or is a suitable alternate to that specified in the *Standard Building Code*, the *SBCCI Standard for Hurricane Resistant Construction*@SSTD 10, and the *International One and two Family Dwelling Code* or Supplements thereto.

9. LIMITATIONS

- 9.1 Calculations and details showing that the anchors comply with this report shall be submitted to the building official for approval.
- 9.2 All fasteners shall be installed according to manufacturer's directions using Powers Fasteners, Inc.'s components, Powers Fasteners' Anchors, drive tools and drill bits for the specific use, application, or installation encountered.
- 9.3 Anchor installation which requires special inspection as noted in the tables shall be subjected to Special Inspection as defined in Section 5.2 of this report.
- 9.4 Allowable loads for anchors in concrete subjected to combined shear and tension forces are determined by the ratio of the actual shear to the allowable shear plus the ratio of the actual tension to the allowable tension not exceeding 1.00.
- 9.5 The allowable loads listed in this report apply to static loading conditions only. Anchors shall not be subjected to dynamic vibratory or shock loads, such as supports for reciprocating engines or crane rails unless adequacy is determined by tests with results approved by the building official. The fasteners shall not be used to provide lateral support for concrete or masonry walls through withdrawal strength.
- 9.6 Anchors that are exposed directly to weather or subject to salt corrosion in coastal areas, shall be stainless steel or hot dipped galvanized in accordance with 202.1.8.3 and 302.1.3 of SSTD 10-99.

PRODUCT SUBMITTAL (Wedge-Bolt)

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- 9.7 Use of Powers Wedge-Bolt Anchors in substrates other than normal weight concrete is outside the scope of this report.
- 9.8 Use of Powers Wedge-Bolt Anchors in fibered concrete is outside the scope of this report.

10. IDENTIFICATION

Each package of Powers Wedge-Bolt Anchors covered by this report shall be labeled with the manufacturer's name and/or trademark, the SBCCI Public Safety Testing and Evaluation Services Inc. initials (SBCCI PST & ESI) or seal, and the number of this report for field identification.

11. PERIOD OF ISSUANCE

SEE CURRENT SBCCI PST & ESI EVALUATION REPORT LISTING FOR STATUS OF THIS EVALUATION REPORT.

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