



SBCCI PUBLIC SAFETY TESTING AND EVALUATION SERVICES INC.

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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 10, 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 1/4", 3/8", 1/2", 5/8", and 3/4" (6, 10, 13, 16, 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 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.

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**

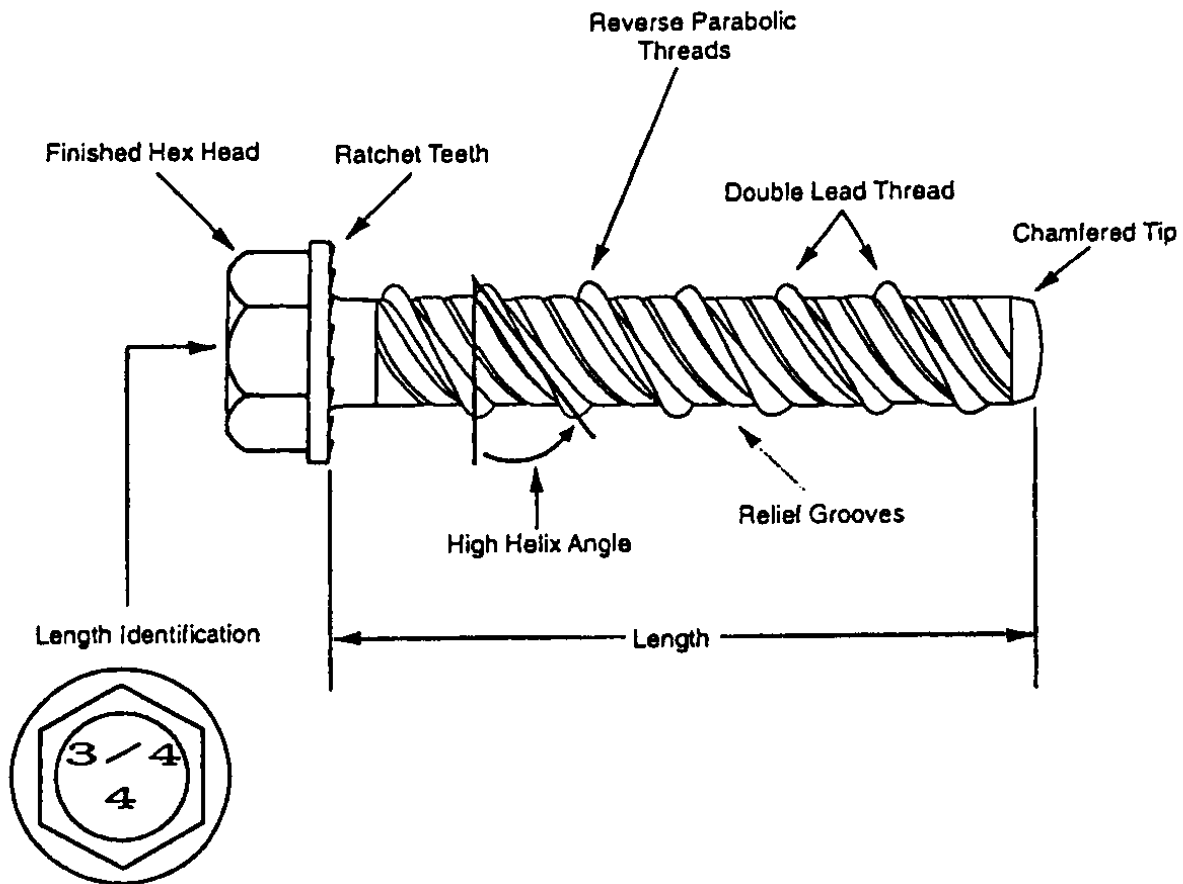


TABLE 1A
MAXIMUM ALLOWABLE TENSION VALUES^{1,2,3} (LBS)
WITH SPECIAL INSPECTION

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.

**TABLE 1B
MAXIMUM ALLOWABLE TENSION VALUES^{1,2,3} (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 33¹/₃ percent for short term loading due to seismic or wind forces.

TABLE 2
MAXIMUM ALLOWABLE SHEAR VALUES^{1,2,3} (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 33¹/₃ percent for short term loading due to seismic or wind forces.

**TABLE 3
ALLOWABLE SPACING AND EDGE DISTANCE**

	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

- 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.

- 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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