

BRIGHTON BEST, INC.

COMMERCIAL ANCHOR - ENGINEERING DATA SHEET

Products

Wedge Anchors – Carbon Steel, Zinc-Plated and Hot Dip Galvanized

Wedge Anchors – Stainless Steel, Types 304, 316

Drop In Anchors – Carbon Steel

The load data is based on testing in accordance with ASTM E488-15, *Standard Test Methods for Strength of Anchors in Concrete Elements*, performed by CEL Consulting and documented in CEL Test Report No. 20B435.

Tables with average ultimate loads from the testing are included plus tables with allowable strength design (ASD) values based on a safety factor of 4 applied to the average ultimate loads. It is noted that building codes in the United States require ultimate strength design (USD) also called load factor and resistance design (LFRD) for design of anchorages to concrete. ASD values are provided to facilitate use by those who want to use ASD.

Installation Requirements

General:

- Drill holes using a rotary hammer drill in the percussion mode perpendicular to the concrete surface. Use drill bits of the correct diameter meeting the requirements of ANSI B212.15-1994, *Carbide-Tipped Masonry Drills and Blanks for Carbide-Tipped Masonry Drills*.
- Concrete thickness must be at least two times anchor nominal diameter greater than the drilled hole depths.
- Follow all applicable safety requirements.

Wedge Anchors (all types):

- Drill holes perpendicular to the concrete surface to the minimum nominal embedment (see table below) or deeper if specified, plus 1/2" for 3/8" through 5/8" diameters and plus 3/4" for 3/4" diameter.
- Remove drilling debris from the holes using compressed air or by hand using a blow out bulb or plastic tubing. A clean hole is necessary to insure the minimum embedment and full expansion.
- Drive the anchor into the hole with a hammer to the required embedment taking care to avoid damaging the threads.
- Position the fixture to be attached over the hole, install the washer and nut and tighten to the required torque value (see table below) using a torque wrench. Alternatively, the fixture may be positioned over the hole and the anchor driven through the clearance hole in the fixture.

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- If torque is not achieved in 8 turns of the nut, loosen the nut, drive the anchor back into the hole to the required embedment and retorque the anchor. If torque still cannot be achieved, remove the anchor and install another anchor at deeper embedment of at least two anchor diameter more than the original embedment.

Anchor Diameter, in.	Minimum Nominal Embedment, in. ¹	Installation Torque, ft.-lbs.
3/8	2 1/4	25
1/2	2 1/2	40
5/8	3 1/2	80
3/4	4	110

¹ Measured from the concrete surface to the embedded end of the anchor

Drop In Anchors:

- Drill holes perpendicular to the concrete surface to a depth equal to the length of the anchor (see table below) or slightly deeper
- Remove drilling debris from the holes using compressed air or by hand using a blow out bulb or plastic tubing. A clean hole is necessary to insure the minimum embedment and full expansion.
- Place the anchor into the hole and drive in with a hammer to at least flush with the concrete surface.
- Insert the setting tool supplied with the anchors into the anchor and apply sharp blows with a hammer to drive the setting tool into the anchor until the shoulder of the setting tool contacts the top of the anchor body.
- Install the fixture to be attached over the hole, install the bolt through the fixture into the anchor and tighten.

Anchor Type	Anchor Diameter, in.	Anchor Length, in. ¹
Standard	3/8	1 9/16
	1/2	2
Shorty	3/8	13/16

¹ Hole depth measured from the concrete surface

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CEL Ultimate Test Results

The following tables provide the average ultimate load results and the installation parameters used for the testing by CEL.

**TABLE 1 – Wedge Anchors Carbon Steel Zinc Plated
Brighton Best Family 279**

Loading	Anchor Diameter, in.	Minimum Embedment, in.	Installation Torque, ft.-lbs.	Average Ultimate Load, lbs.
Tension	3/8	2 1/4	25	4399
	1/2	2 1/2	40	5837
	5/8	3 1/2	80	8456
	3/4	4	110	11510
Shear	3/8	2 1/4	25	3341
	1/2	2 1/2	40	5805
	5/8	3 1/2	80	10949
	3/4	4	110	17194

**TABLE 2 – Wedge Anchors Carbon Steel Hot Dip Galvanized
Brighton Best Family 158**

Loading	Anchor Diameter, in.	Minimum Embedment, in.	Installation Torque, ft.-lbs.	Average Ultimate Load, lbs.
Tension	3/8	2 1/4	25	3154
	1/2	2 1/2	40	5509
	5/8	3 1/2	80	8349
	3/4	4	110	9360
Shear	3/8	2 1/4	25	3882
	1/2	2 1/2	40	7038
	5/8	3 1/2	80	12827
	3/4	4	110	19112

**TABLE 3 – Wedge Anchors Stainless Steel
Brighton Best: Family 616, Type 304; Family 617, Type 316**

Loading	Anchor Diameter, in.	Minimum Embedment, in.	Installation Torque, ft.-lbs.	Average Ultimate Load, lbs.
Tension	3/8	2 1/4	25	3993
	1/2	2 1/2	40	4758
	5/8	3 1/2	80	7112
	3/4	4	110	10318
Shear	3/8	2 1/4	25	6928
	1/2	2 1/2	40	8288
	5/8	3 1/2	80	15603
	3/4	4	110	20897

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**TABLE 4 – Drop In Shorty Carbon Steel Anchors
Brighton Best Family 268**

Loading	Anchor Diameter, in.	Minimum Embedment, in.	Average Ultimate Load, lbs.
Tension	3/8	13/16	1563
Shear		13/16	2102

**TABLE 5 – Drop In Standard Carbon Steel Anchors
Brighton Best Family 268**

Loading	Anchor Diameter, in.	Minimum Embedment, in.	Average Ultimate Load, lbs.
Tension	3/8	1 9/16	3016
	1/2	2	4612
Shear	3/8	1 9/16	5353
	1/2	2	8105

Allowable Strength Design Values

**Wedge Anchors Carbon Steel Zinc Plated
Brighton Best Family 279
Allowable Tension Design Values, lbs.**

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi			
	2500	3000	3500	4000
3/8	1100	1205	1300	1390
1/2	1460	1600	1725	1845
5/8	2115	2315	2505	2675
3/4	2880	3155	3410	3645

**Wedge Anchors Carbon Steel Zinc Plated
Brighton Best Family 279
Allowable Shear Design Values, lbs.**

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi
	2500
3/8	835
1/2	1450
5/8	2735
3/4	4300

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Wedge Anchors Carbon Steel Hot Dip Galvanized
Brighton Best Family 158
Allowable Tension Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi			
	2500	3000	3500	4000
3/8	790	865	935	1000
1/2	1375	1505	1625	1740
5/8	2085	2285	2465	2635
3/4	2340	2565	2770	2960

Wedge Anchors Carbon Steel Hot Dip Galvanized
Brighton Best Family 158
Allowable Shear Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi
	2500
3/8	970
1/2	1760
5/8	3205
3/4	4780

Wedge Anchors Stainless Steel
Brighton Best: Family 616, Type 304; Family 617, Type 316
Allowable Tension Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi			
	2500	3000	3500	4000
3/8	1000	1095	1185	1265
1/2	1190	1305	1410	1505
5/8	1780	1950	2105	2250
3/4	2580	2825	3055	3265

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Wedge Anchors Stainless Steel Types 304, 316
Brighton Best: Family 616, Type 304; Family 617, Type 316
Allowable Shear Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi
	2500
3/8	1730
1/2	2070
5/8	3900
3/4	5225

Drop In Anchors Carbon Steel Shorty Version
Brighton Best Family 268
Allowable Tension Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi			
	2500	3000	3500	4000
3/8	390	425	460	495

Drop In Anchors Carbon Steel Shorty Version
Brighton Best Family 268
Allowable Shear Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi
	2500
3/8	525

Drop In Anchors Carbon Steel Standard Version
Brighton Best Family 268
Allowable Tension Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi			
	2500	3000	3500	4000
3/8	755	825	895	955
1/2	1155	1265	1365	1460

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Drop In Anchors Carbon Steel Standard Version
Brighton Best Family 268
Allowable Shear Design Values, lbs.

ANCHOR DIAMETER, (inches)	MINIMUM CONCRETE COMPRESSIVE STRENGTH, f'_c , psi
	2500
3/8	1340
1/2	2025

Wedge and Drop In Anchor Spacing & Edge Distances

ANCHOR DIAMETER, (inches)	Spacing or Edge Distance, (inches)	
	Tension & Shear Capacity	
	100%	50% ¹
3/8	6 3/4	3 3/8
1/2	7 1/2	3 3/4
5/8	10 1/2	5 1/4
3/4	12	6

¹ Minimum distances for use - reduce load capacities in tables by 50%; use linear interpolation for load capacity reductions for distances between 100% & 50%