

## CB-1-B Anchor



### APPLICATIONS:

Permanent or temporary attachment to concrete, steel or wood. If using as a permanent attachment, anchor must be flashed.

**Wood Decking** 3/4" CDX Plywood or better

**Metal Decking** 20ga. and thicker

**Concrete** (2000p.s.i. min.)

\*fasteners not included

### FEATURES:

Powder coated finish

Can facilitate horizontal lifeline systems for up to four workers in restraint

Weighs only 4 lbs

Swivel D-ring

6"x6"x1/2" base plate

### SUBSTRATE SPECIFIC ANCHOR INSTALLATION:

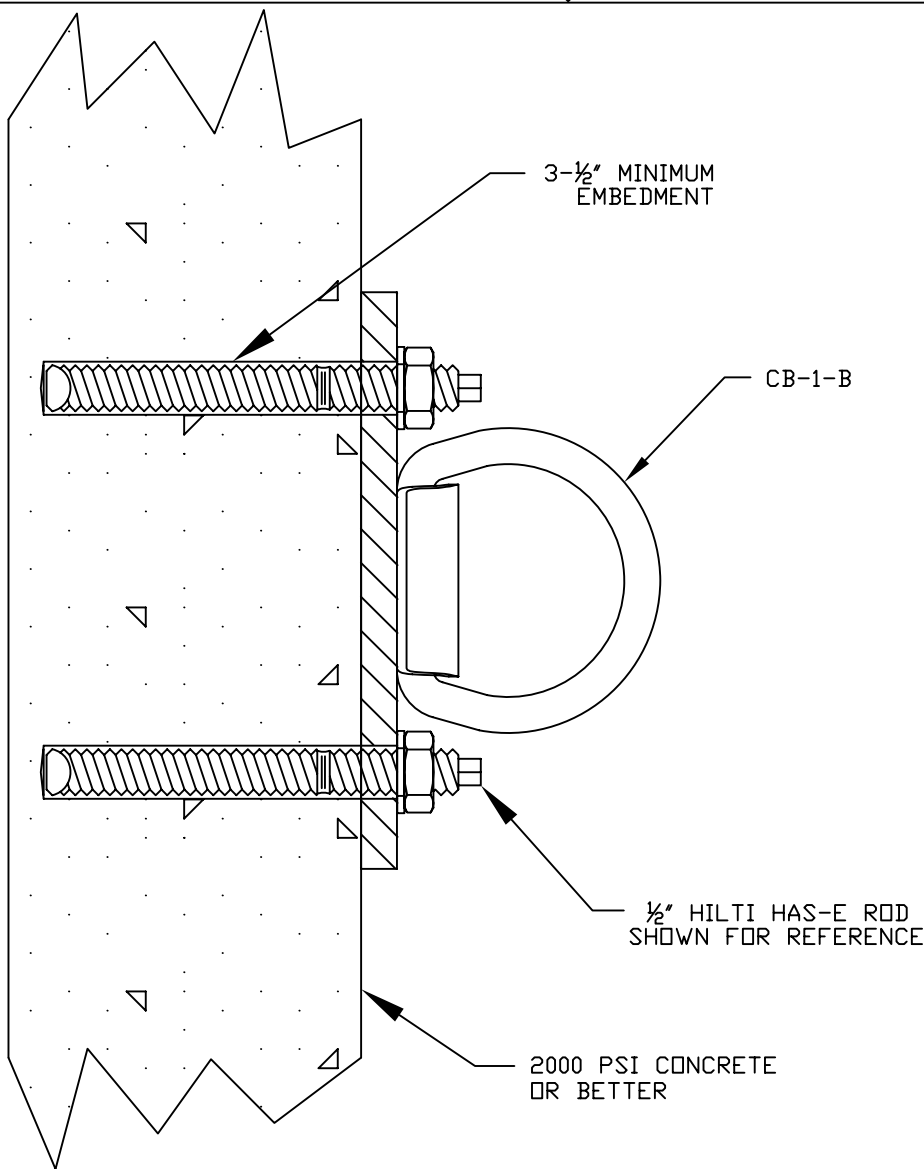
#### For Wood and Metal Substrates meeting min. requirements:

It is required that the user purchase 1/2" diameter bolts with a pullout strength of 6,000 lbs each to fill all four of the pre-punched holes to meet the anchor pullout requirements. Bolts can be purchased at local fastener dealer.

#### For Concrete Applications:

Guardian recommends epoxy or expansion anchors that are 1/2" diameter and have a min. embedment of 3" after installation. The epoxy anchors shall sustain a minimum pull-out of at least 6,000 pounds. Consult your local fastener distributor or Rawl book for more information.

CB-1-B is tested to meet all applicable ANSI Z359.1 standards and comply with OSHA standards. Use only with compatible equipment.



**NOTES:**

1. Secure the CB-1-B anchor to 2000 psi concrete or better.
2. Use all 4 of the  $\frac{9}{16}$ " diameter holes provided.
3. Use  $\frac{1}{2}$ " diameter anchor bolts with an ultimate tensile strength of 6000 lbs. or higher. All anchor bolts must be embedded a minimum of  $3-\frac{1}{2}$ ".
4. Hilti HIT HY-150/HIT-ICE adhesive using HAS-E rods are shown for reference. Use an equivalent or superior system when substituting.
5. Considerations for weather must be taken into consideration when selecting anchor bolts for installing CB-1-B anchors.
6. Always follow the anchor bolt manufacturer's installation instructions for minimum concrete thickness and torque requirements.

INSTALLATION INSTRUCTIONS			TITLE CB SERIES WALL ANCHOR			
DESIGNED BY:	B. WOODYARD	1992	DWG NO. CB-1-B			
DRAWN BY:	PHIL GOMES	08/19/2004			A	NEW
CHECKED BY:	M. VOLLMER	CHECKED DATE	SCALE: NONE		SHEET: 1	
APPD BY:	M. VOLLMER	APPROVED DATE				



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24322 180<sup>th</sup> S.E.  
Kent, WA 98042

ATTN: Mr. Bud Woodyard

RE: CB SERIES Fall PROTECTION SYSTEM  
Model CB-1 SERIES

Gentlemen;

As per your request, SETS has prepared the design data and reviewed it for the above referenced fall protection system. The calculations and drawings are attached on the following pages.

The following items were used as minimum values for the design process.

- ☛ A certified welder using E-70xx electrodes shall perform all welding.
- ☛ Anchor bolts (CB-1B) shall have a minimum ultimate pullout load of at least 6,000 pounds.

If you have any questions concerning the above items, the procedures used, or if SETS can be of any further assistance please call on us at (206) 833-7967.

Respectfully Submitted,  
**SPEARS ENGINEERING & TECHNICAL SERVICES**

J. Frank Spears, P.E.  
Principal



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## Model CB-1 SERIES STRUCTURAL CALCULATIONS

Outer Plate Diameter = 2.500	Load, P = 5,000 pounds
Inner Plate Diameter = 2.000	Moment Length = 1/2 inches
	Moment, M = 2,500 in-lbs
Weld Size: 1/4 in	Electrode Designation, F <sub>xx</sub> : 70,000 lbs/in <sup>2</sup>
Effective Weld Length, L <sub>w</sub> : 7.85 in	Yield Strength, F <sub>y</sub> : 35,000 lbs/in <sup>2</sup>
Effective Throat, t <sub>w</sub> : 0.177 in	Tensile Strength, F <sub>u</sub> : 60,000 lbs/in <sup>2</sup>
Effective Weld Area, A <sub>w</sub> : 1.39 in <sup>2</sup>	Effective Sec. Modulus, S <sub>c</sub> : 4.91 in <sup>2</sup>
<b>1996 UBC Sec 27.903 E Connections &amp; Joints</b>	
Shear Loads	
L/t = 44.44	Longitudinal Loading      Transverse Loading
P <sub>n</sub> = (1-(0.01 x L/t)) x t x L x F <sub>u</sub>	0.75 x t x L x F <sub>u</sub> t x L x F <sub>u</sub>
P <sub>n</sub> = 46,280	62,469      83,291
P <sub>a</sub> = P <sub>n</sub> / 2.5 =      lbs	24,987 lbs      33,317 lbs
P <sub>a</sub> = 24,987 lbs	
Moment Loads	
M <sub>n</sub> = S <sub>c</sub> x F <sub>y</sub> = 171,806	t > 0.150 inch
M <sub>a</sub> = M <sub>n</sub> / 1.67 = 102,878	0.75 x t <sub>w</sub> x L x F <sub>xx</sub>
Combined Shear & Moments	
M/M <sub>a</sub> = 0.0243007	Should Be Less      72,880
	than or Equal to 1.0      29,152 lbs
P/P <sub>a</sub> = 0.2001005	Total = 0.2244
	<b>Weld is OK</b>
<b>AISC Method</b>	
Allwable Shear Stress, F <sub>v</sub> : 0.30 x F <sub>xx</sub> = 21,000 lbs/in <sup>2</sup>	f <sub>v</sub> f
0.40 x F <sub>y</sub> = 14,000 lbs/in <sup>2</sup>	P / (L <sub>w</sub> x t <sub>w</sub> ) = P / A <sub>w</sub> (f <sub>v</sub> <sup>2</sup> + f <sub>b</sub> <sup>2</sup> ) <sup>0.5</sup>
0.60 x F <sub>y</sub> = 21,000 lbs/in <sup>2</sup>	3,602 lbs      3,638 lbs
	f <sub>b</sub> <b>Weld is OK</b>
	M x c / I = M / S = P x e / S
	509 lbs
<b>Factor of Safety Against Pull-out</b>	
	Load, P = 5,000 pounds
	Ultimate Pullout for Epoxied Anchor Bolts = 6,000 pounds
	# of bolts holding each edge of the baseplate = 2
	<b>Factor of Safety = 2.40</b>