ClearView GLASS RAILINGS

CVGR NEXT-GEN LEVER SPIGOT INSTALLATION

ClearView Glass Railings **NEXT-GEN** Patented Lever Spigots have three important new features:

1) **NEXT-GEN** Lever spigots now include a backer plate with four leveling screws, one screw on each side of the spigot. The leveling screws allow for easier installation on irregular surface decks and decks that are not level.

2) **NEXT-GEN** lever spigot lever pulls up to lock in place which in turn pushes the Hercules Glass panel down into the spigot fully seating the Hercules Glass panel in the lever spigot.

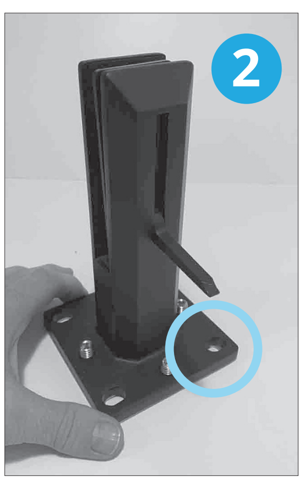
3) New Square Matte Black Lever spigot Figure C)! The square matte black finish lever spigot is IN addition to our traditional round brushed stainless steel lever spigot.

All ClearView Glass Railings patented lever spigots are made of Duplex 2205 Stainless Steel which offers greater strength and greater corrosion protection than 316 Stainless Steel.

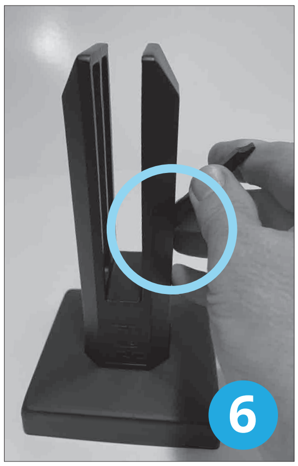
How to Install NEXT-GEN Patented Lever Spigots

1. Position backer plate at location spigot is to be attached to deck/surface. (Fig. 1).
2. Place spigot on positioned backer plate. Line up the holes of the backer plate with the holes of the spigot. Install spigot fasteners (not included) through aligned holes (Fig. 2).
3. Place level on side of spigot and adjust leveling screws accordingly to level spigot side to side (Fig 3).
4. Place level on front of spigot (side with lever) and adjust leveling screws accordingly to level spigot front to back (Fig 4).

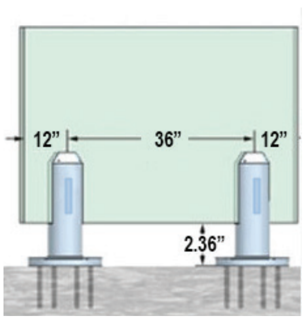
   NOTE: You will need to loosen the fasteners attaching the spigot and backer plate to your deck surface in order to adjust the leveling screws. Tighten fasteners once the spigot is level.



5. Place cover ring on spigot (Fig 5).
6. Open lever part way - but not all the way as the inside nub of the lever will interfere with your ability to slide the glass panel in (Fig 6). Note: Always make sure that the metal plate in the spigot boot sits next to the inside nub of the spigot lever. Boot should already be in spigot. You're ready to insert the glass.
7. Make a mark on the glass at the center point where it will be lined up in the spigot. This mark will be covered by the spigot when installed. Center marked line on the glass with center of spigot and lower glass into spigot (Fig 7).
8. Push lever upward until snug. You may have to tap the lever up with a piece of wood to completely engage lever into place (Fig 8).

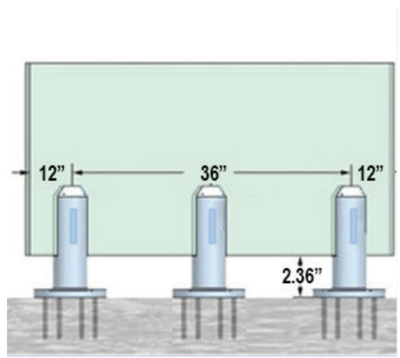


Once glass is in place, you can check for fit by pulling up on glass panel. If glass is not tight in Lever Spigot with lever closed, open lever and install the 0.2mm shim (provided) between the plastic boot and the inside of the Lever Spigot. DO NOT PLACE SHIM AGAINST GLASS PANEL.



2 SPIGOT INSTALLATION

Will Withstand Wind Gusts up to 115 MPH



3 SPIGOT INSTALLATION

Will Withstand Hurricane Force Winds

Wood Deck Installation

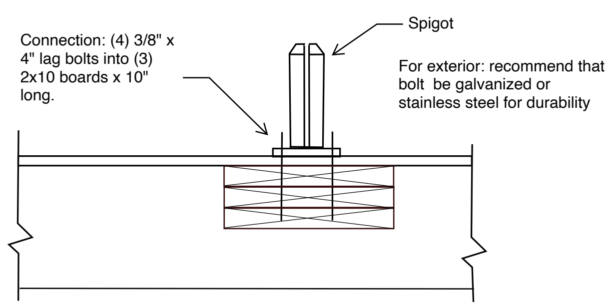
We suggest using 3/8" diameter x 3.5" ASTM A307 Grade A structural bolts and flat washer. ASTM A307 Grade A structural bolts and washer should be cadmium plated or stainless steel so they do not rust.

Lag bolts must be installed into rim joists or lam beam or properly blocked sub structure. If lag bolts are attached to deck planks only failure will occur as a result of improper installation. Improper installation and failure may result in injuries or death. Do it once and do it right!

Installation of Spigots Using Wood Planks

Installation of ClearView Glass Railings® Spigots to wood planks are fine as long as you use three 2" x10"s. You must tie the three plies of wood together with (4) #8 4" wood screws, located 3" from spigot screws.

More installation information including additional fastener product recommendation listed on next page. Product Specifications included as well.



Fastener Recommendation (Fasteners by others)

We recommend RSS Rugged Structural Screws by GRK Fasteners (product image shown).

This product is available at Home Depot:

- Internet #203525067
- Model #112225
- Store SKU #518167

Installation Tips

- Mark spigot location on glass panels with a crayon or wax marker. This allows for fast and easier installation of panel in proper location.

• VERY IMPORTANT •

- Apply a bit of lubricant (petroleum jelly) to the inside of the spigot's black plastic boot where the boot meet the glass. The application of lubrication prevents the spigot's black plastic boot from grabbing the glass panel should you slide/move the glass to adjust its position while in the spigots.
- Once glass is in place, you can check for fit by pulling up on glass panel. If glass is not tight in Lever Spigot with lever closed, open lever and install the 0.2mm shim (provided) between the plastic boot and the inside of the Lever Spigot. DO NOT PLACE SHIM AGAINST GLASS PANEL.
- Do not attempt to slide the glass panel while it is in the spigot if there is no lubricant on the black plastic spigot boot as the glass panel may stick and fail.
- If no lubrication is applied to the spigot boot, you must lift the glass panel out of the spigot, adjust its position as desired and then lower the glass panel back into the spigot.

GENERAL NOTES:

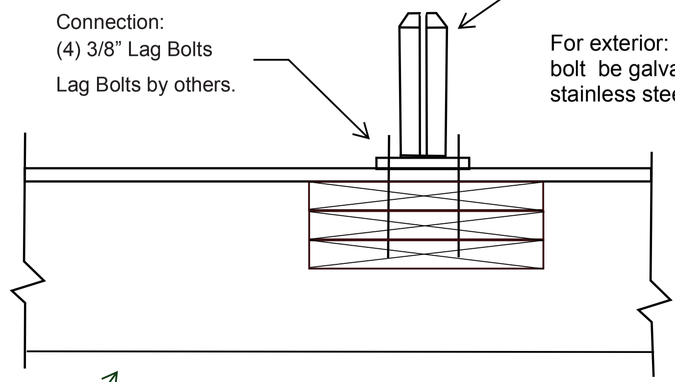
1. THIS GUARDRAIL SYSTEM IS IN COMPLIANCE WITH THE 2014 AND 2017 INTERNATIONAL BUILDING CODE (IBC) SECTION 1607.8. IT IS ALSO IN ACCORDANCE WITH 2015 IBC SECTION 2407 THAT REQUIRES ALL-GLASS HANDRAILS AND GUARDS BE "LAMINATED GLASS CONSTRUCTED OF FULLY TEMPERED OR HEAT-TREATED GLASS". 2. GLASS PANELS AND SUPPORTING SPIGOTS MEET ALL INTERNATIONAL BUILDING CODE (IBC, 2020) REQUIREMENTS. INSTALLATION STRENGTH WILL VARY DEPENDING ON THE STRENGTH OF THE SUPPORT STRUCTURE, AND SHOULD BE DESIGNED BY A QUALIFIED ENGINEER, BASED ON THE IBC AND MODEL CODES FOR SUPPORTING MATERIALS. 3. CONNECTION TO DECK SHOWN (4) 3/8" LAG BOLTS THROUGH DECK TO (3) 2X10 BOARDS, MEETS IBC DECK REQUIREMENTS FOR A 200 POUND POINT LOAD OR 50 POUND LINE LOAD AT ANY PLACE ON PANEL. LOADING TO BE EITHER VERTICAL OR HORIZONTAL BUT NOT SIMULTANEOUS. 4. WHEN THREE SPIGOTS ARE USED, THIS PRODUCT COMPLIES WITH THE REQUIREMENTS FOR HIGH VELOCITY HURRICANE ZONES (HVHZ). 5. SPIGOTS TO BE DUPLEX 2205 STAINLESS STEEL. 6. MECHANICAL FASTENERS, AS SHOWN 8. FASTENERS BY OTHERS.

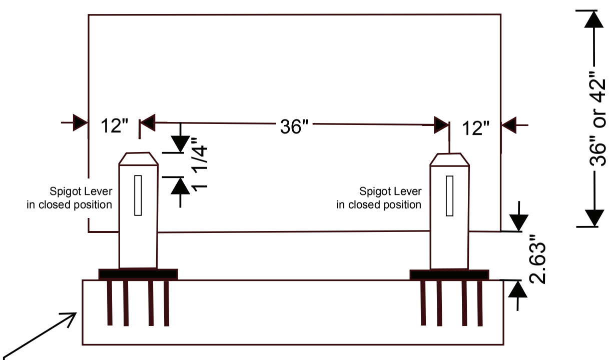
Specifications

Part Number	CVGR Duplex 2205 Stainless Steel Satin Finish
Product Name	Round Deck Mount Spigot
Spigot Size	1.9" diameter x 7.1" tall
Spigot Weight	5.5 lbs.
Glass Thickness/ Dims/Weight (per panel)	13.1mm/ 60" width x 39.37" height/105 lbs.
Accessories Included	Base Cover, Plastic and Metal Spigot Boot, One 0.2mm Metal Shim

(Fasteners by others)

CVGR Lever Spigot Attachment to Wood Deck
(additional instructions)





NOTE: Panels in high wind coastal areas require three spigot, all other areas require two.

GENERAL NOTES:

1. CONNECTION TO DECK SHOWN (4) 3/8” LAG BOLTS THROUGH DECK TO (3) 2X10 BOARDS, MEETS IBC DECK REQUIREMENTS FOR A 200 POUND POINT LOAD OR 50 POUND LINE LOAD AT ANY PLACE ON PANEL. LOADING TO BE EITHER VERTICAL OR HORIZONTAL BUT NOT SIMULTANEOUS. FASTENERS BY OTHERS.
2. WHEN THREE SPIGOTS ARE USED, THIS PRODUCT COMPLIES WITH THE REQUIREMENTS FOR HIGH VELOCITY HURRICANE ZONES (HVHZ).
3. SPIGOTS TO BE DUPLEX 2205 STAINLESS STEEL.
4. CONNECTION TO STRUCTURE VARIES BY PROJECT. THE ABILITY OF THE EXISTING HOST STRUCTURE TO SAFELY SUPPORT THE LOADS SHALL BE DETERMINED BY THE PROJECT ENGINEER.
5. MECHANICAL FASTENERS, AS SHOWN.
6. FASTENERS BY OTHERS.

Part Number	CVGR Duplex 2205 Stainless Steel Satin Finish
Product Name	Round Deck Mount Spigot
Spigot Size	1.9" diameter x 7.1" tall
Spigot Weight	5.5 pounds
Glass Thickness/ Dimensions/Weight (per panel	13.1 mm/60" wide x 39.37" tall/ 105 pounds
Accessories Included	Base Cover, Plastic and Metal Spigot Boot, One 0.2mm Metal Shim

ClearView®
GLASS RAILINGS

CONCRETE INSTALLATION

A

Make a wood jig to correct location of spigot holes. Make sure holes line up with desired spigot/glass panel alignment.

B

Drill holes in concrete using wood jig. Remove jig and confirm depth of each hole.

C

Clean debris from every hole. Install studs per stud manufacturer instructions.

D

Place spigot on studs. Install nuts and hand tighten.

E

Confirm all spigots are in alignment and level.

F

Confirm each panel's spigots are in alignment and properly spaced. Tighten all nuts. Install beauty ring. Install glass panel.

John,
CVGRailings spigot baseplate is about 4” diameter. With this, I have come up with the following:

I am specifying an adhesive anchor system by HILTI: 3/8” diameter HIT-Z anchor, with their HY200-R adhesive. Effective embedment = 2 3/8”. HILTI has many anchors and it is important that they use this exact anchor. I have attached the HILTI report that describes this design. It is important that they closely follow the installation steps, especially the hole preparation: the most common failure mechanism is a lack of bond between the adhesive and the concrete because the installer did not remove all dust within the hole before injecting the adhesive. A lack of correct preparation will void these calculations and HILTI’s support of their anchor. This is important.

This design assumes a 3.15” spacing between anchors, into a concrete slab. Anchors to be at least 6” from all embedded PT cables and from the edge of the concrete slab. The location of the cables to be determined by others.

Note that the loads shown in the report come from my computer modeling of a 200 pound/ft (plf) horizontal line load applied to the top of the 42” tall panel. As a reminder, the IBC requires guardrails be designed to resist a 50 plf horizontal line load @ the top of the panel; the code has increased this by a factor of 4 for all-glass panels such as yours, hence, the 200 plf.

You should be able to forward this directly to the installer of the PT deck. They can order the anchor and adhesive directly from HILTI through their website if they don’t have a local rep (Home Depot carries HILTI products).

Best regards,

Chris

American Engineering Testing, Inc.

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Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete - Apr 5, 2021	Date:	4/5/2021
Fastening point:			

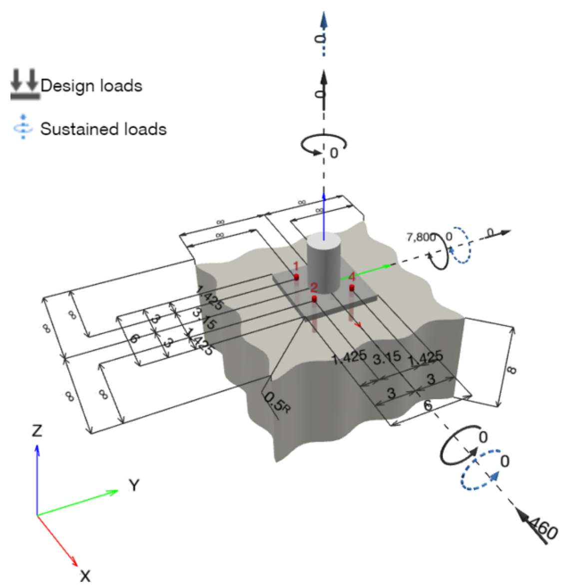
Specifier's comments:

1 Input data

Anchor type and diameter:	**HIT-HY 200 + HIT-Z 3/8**
Item number:	2018440 HIT-Z 3/8" x 4 3/8" (element) / 2022793 HIT-HY 200-R (adhesive)
Effective embedment depth:	$h_{ef,opti}$ = 2.375 in. ($h_{ef,limit}$ = 4.500 in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-3187
Issued I Valid:	4/1/2020 | 3/1/2022
Proof:	Design Method ACI 318-08 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R] :	l_x x l_y x t = 6.000 in. x 6.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	Round bars (AISC), 2 1/2; (L x W x T) = 2.500 in. x 2.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	no

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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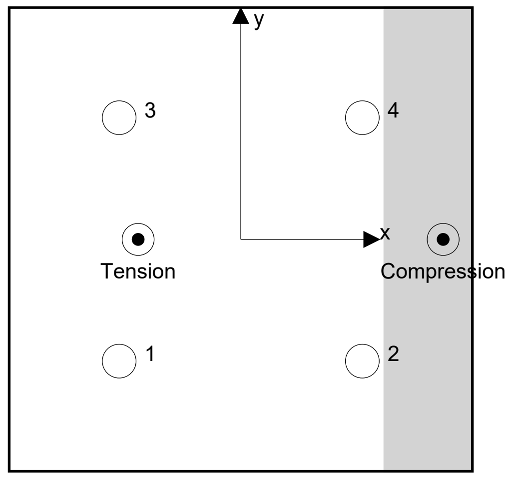
1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	$N = 0; V_x = -460; V_y = 0;$ $M_x = 0; M_y = 7{,}800; M_z = 0;$ $N_{sus} = 0; M_{x,sus} = 0; M_{y,sus} = 0;$	no	51

2 Load case/Resulting anchor forces



Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	910	115	-115	0
2	77	115	-115	0
3	910	115	-115	0
4	77	115	-115	0

max. concrete compressive strain:	0.13 [‰]
max. concrete compressive stress:	580 [psi]
resulting tension force in (x/y)=(-1.329/0.000):	1,974 [lb]
resulting compression force in (x/y)=(2.622/0.000):	1,974 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	910	4,749	20	OK
Pullout Strength*	910	5,169	18	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	1,974	3,874	51	OK

* highest loaded anchor **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-3187

$\phi\ N_{sa} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.08	94,200

Calculations

N_{sa} [lb]
7,306

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
7,306	0.650	4,749	910

3.2 Pullout Strength

N_{pn} = N_p refer to ICC-ES ESR-3187

$\phi\ N_{pn} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

Variables

N_p [lb]
7,952

Calculations

-
-

Results

N_{pn} [lb]	$\phi_{concrete}$	$\phi\ N_{pn}$ [lb]	N_{ua} [lb]
7,952	0.650	5,169	910

3.3 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N} \ \psi_{ed,N} \ \psi_{c,N} \ \psi_{cp,N} \ N_b$ ACI 318-08 Eq. (D-5)

$\phi \ N_{cbg} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9 \ h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 \ e_N'}{3 \ h_{ef}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c \ \lambda \ \sqrt{f_c'} \ h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2.375	1.329	0.000	∞	1.000

c_{ac} [in.]	k_c	λ	f_c' [psi]
3.563	17	1	4,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
105.58	50.77	0.728	1.000	1.000	1.000	3,935

Results

N_{cbg} [lb]	$\phi_{concrete}$	$\phi \ N_{cbg}$ [lb]	N_{ua} [lb]
5,960	0.650	3,874	1,974

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4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	115	1,929	6	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	460	5,729	9	OK
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-3187

ϕ $V_{steel} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$\alpha_{V,seis}$
0.08	94,200	1.000

Calculations

V_{sa} [lb]
3,215

Results

V_{sa} [lb]	ϕ $_{steel}$	ϕ V_{sa} [lb]	V_{ua} [lb]
3,215	0.600	1,929	115

4.2 Pryout Strength (Concrete Breakout Strength controls)

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b \right]$ ACI 318-08 Eq. (D-31)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e_N'}{3\ h_{ef}}} \right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c\ \lambda\ \sqrt{f_c'}\ h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
1	2.375	0.000	0.000	∞

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ	f_c' [psi]
1.000	3.563	17	1	4,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
105.58	50.77	1.000	1.000	1.000	1.000	3,935

Results

V_{cpg} [lb]	$\phi_{concrete}$	$\phi\ V_{cpg}$ [lb]	V_{ua} [lb]
8,184	0.700	5,729	460

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.510	0.080	5/3	35	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

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6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2018, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- The present version of the software does not account for special design provisions for overhead applications. Refer to related approval (e.g. section 4.1.1 of the ICC-ESR 2322) for details.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/

Fastening meets the design criteria!

7 Installation data

Profile: Round bars (AISC), 2 1/2; (L x W x T) = 2.500 in. x 2.500 in.

Hole diameter in the fixture (pre-setting) : d_f = 0.438 in.

Hole diameter in the fixture (through fastening) : d_f = 0.500 in.

Plate thickness (input): 0.500 in.

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and diameter: HIT-HY 200 + HIT-Z 3/8

Item number: 2018440 HIT-Z 3/8" x 4 3/8" (element) / 2022793 HIT-HY 200-R (adhesive)

Maximum installation torque: 177 in.lb

Hole diameter in the base material: 0.438 in.

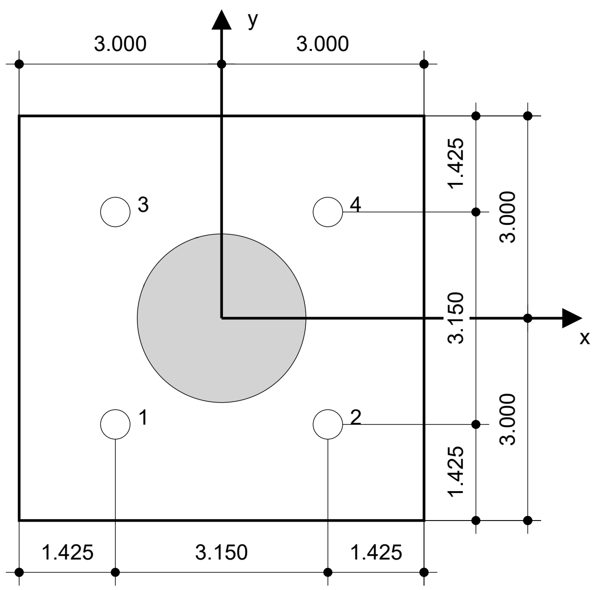
Hole depth in the base material: 2.375 in.

Minimum thickness of the base material: 4.625 in.

3/8 Hilti HIT-Z Carbon steel non-cleaning bonded expansion anchor with Hilti HIT-HY 200 Safe Set System

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• -	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor [in.]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-1.575	-1.575	-	-	-	-
2	1.575	-1.575	-	-	-	-
3	-1.575	1.575	-	-	-	-
4	1.575	1.575	-	-	-	-

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Fastening point:			

8 Remarks; Your Cooperation Duties

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