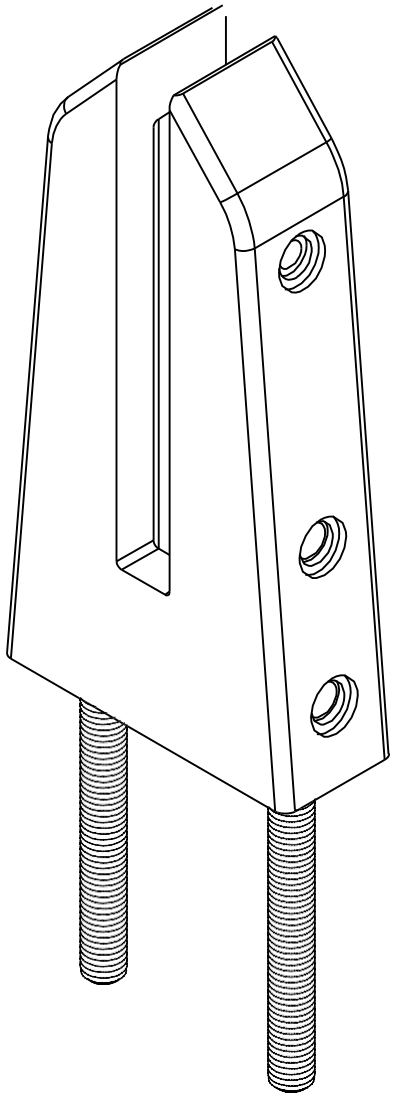
GL ASS VICE®

INSTALLATION MANUAL



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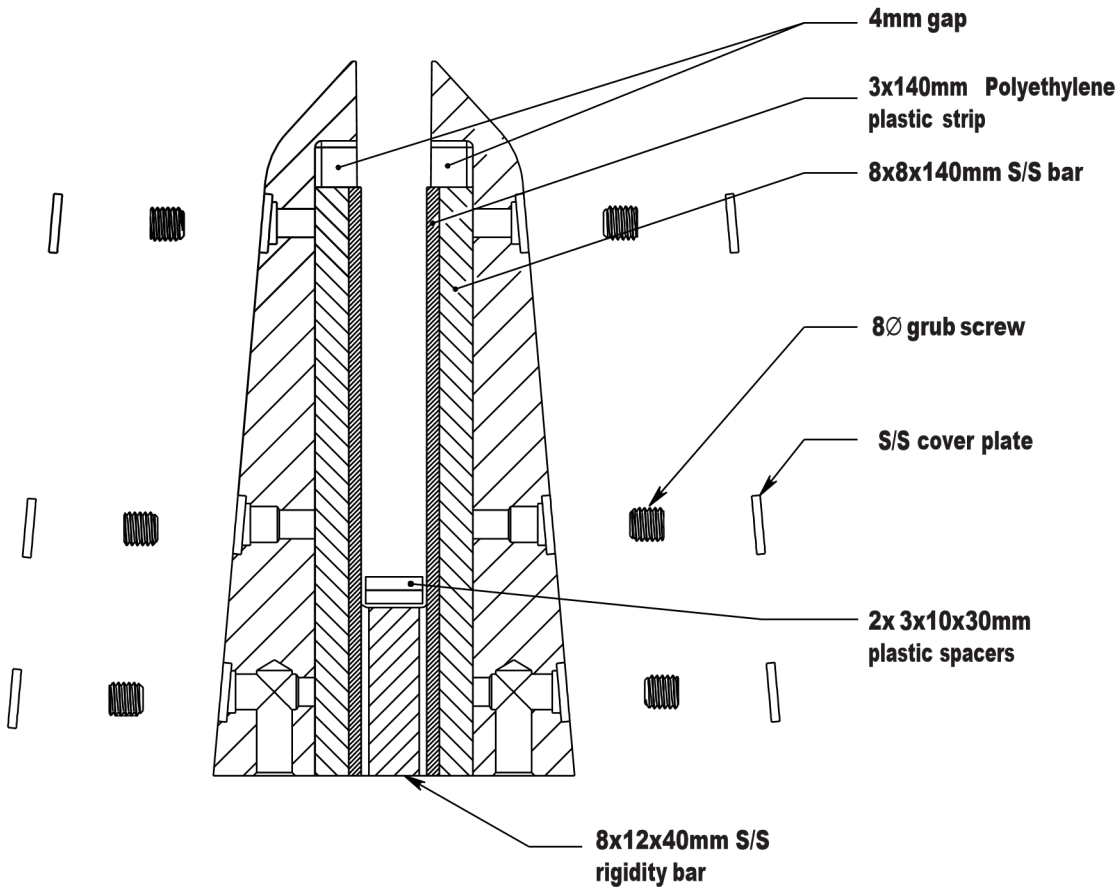
UNITED STATES OF AMERICA VERSION JULY 2015

ASSEMBLY OF ADJUSTABLE CL AMPING SYSTEM



Before inserting the glass you must install the clamping system and grub screws.

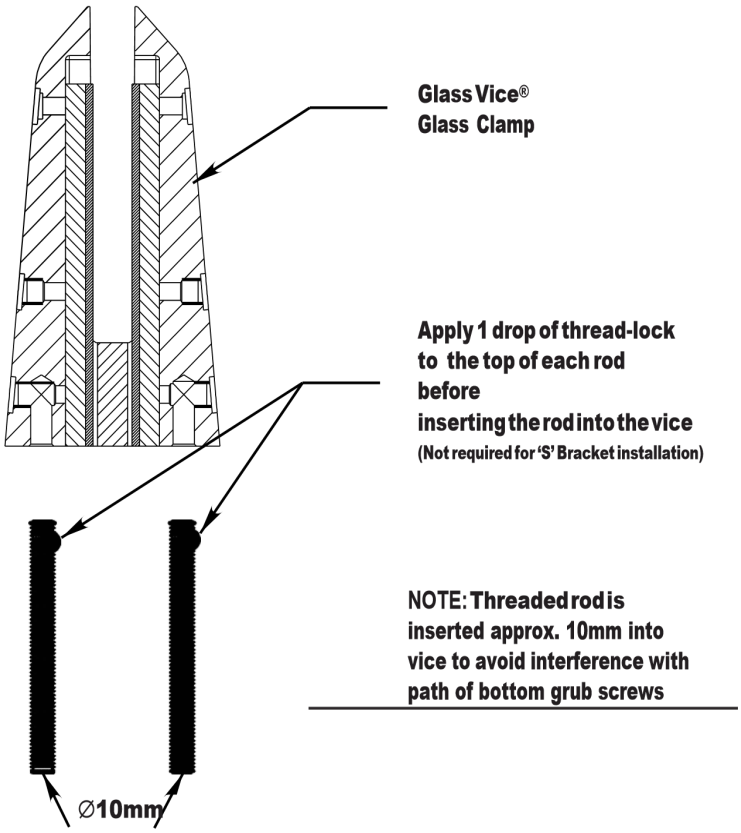
Step 1: Insert 8x8x140mm (5/16x5/16x5-1/2in.) bar into internal cavity. One each side.
Insert 3x140mm (1/8x5-1/2in) polyethylene strip in front of each bar.
Insert the 8x12x40mm (15/16x1/2x1-9/16in) rigidity bar into the center bottom cavity. 12mm and 16mm thick bars. 12mm for 1/2" & 9/16". 16mm for 5/8" thick glass.
Then insert the 2x 3x10x30mm (1/16x1/8x3/8x1-1/8in) plastic spacers on top of the rigidity bar.

Step 2: Insert glass.

Step 3: Using appropriate size hex key insert grub screws into each hole. Turn approximately 3 full turns of the hex key for each grub screw.

You are now ready to install the glass.

ATTACHMENT OF INTERCHANGEABLE BASES & THREADED RODS



threaded rod

Before attachment of M10 threaded rod, apply a drop of thread-lock to each of the threaded rods to be screwed into the base clamp.

Before attachment of the Base Plate (if applicable), a layer of prolan protective lanolin (or similar) should be applied between the Glass Vice glass clamp and the 'S' bracket.

NOTE: The Vice is affixed with 2 x M10 rods into a substrate. The M10 rods are adhered with high performance epoxy resin. Epoxy must cure for approximately 20 hours. As such, it is recommended that a frameless glass installation take place over 2 days :

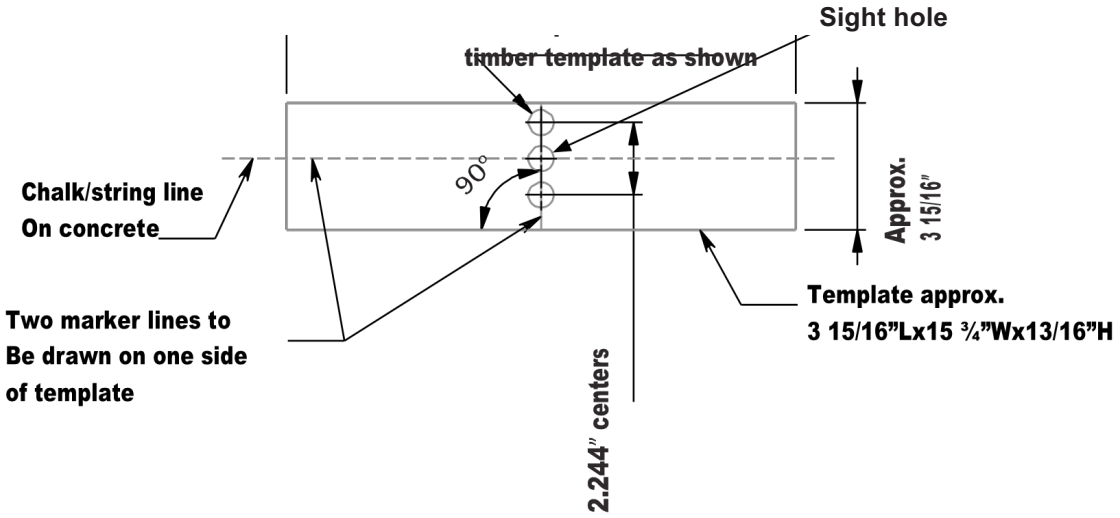
DAY 1 – Drill and install all Vices and allow epoxy to set.

DAY 2 – Install glass panels. With the patented adjustability of the Vice 'double friction' glass clamping method, installation of glass can happen quickly on day 2. NOTE: Do not epoxy Vice until the thread-lock has set and there is no movement in the threaded rods.

DIRECT FIXING OF GLASS VICE® INTO CONCRETE/ TILE

A template is required for precise drilling of holes for the threaded rods protruding from the Glass Vice® base are inserted.

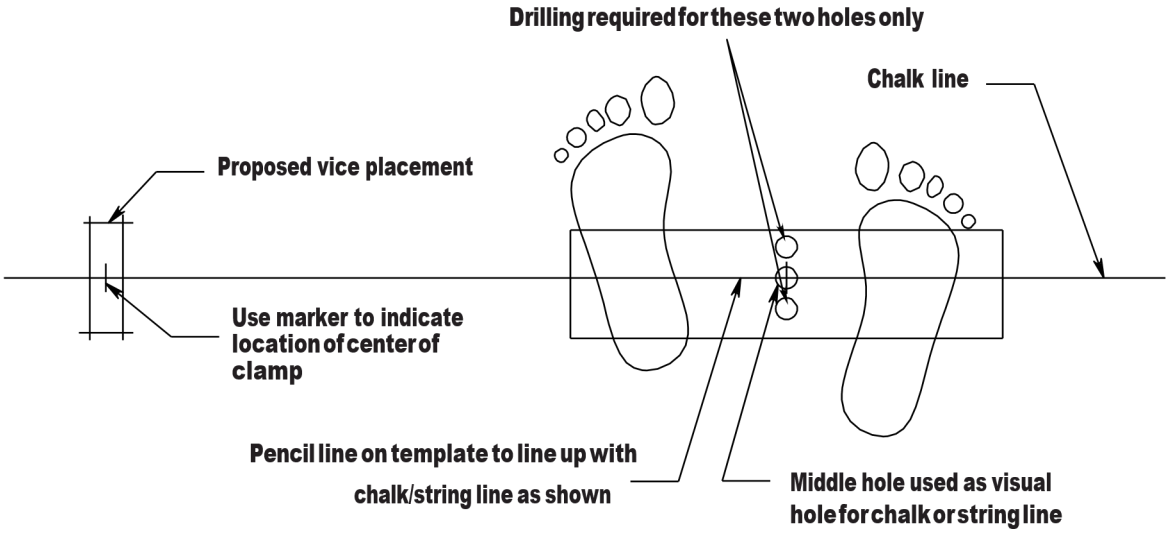
SETUP AND LAYOUT OF TEMPLATE



The drawing above shows the layout of an installation template.
Top & bottom holes – Provides position to drill your (2) holes for the M10 threaded rods to set in epoxy.
Center hole- Sight hole to view chalk line/string line. Center point of glass.

HOW TO USE A TEMPLATE

Chalk/String line - The center of the Glass Vice® is marked on the chalk line. Use the middle hole to sight the center mark.



DRILLING HOLES FOR GLASS VICE®

Place template in position. With one foot on each side of the template, using a 20mm diamond core drill bit, core a hole 3/8" deep and remove the 2x cores. Then, using an 18mm/.7"approx masonry bit, drill 4-1/4" deep for options 1a and 1b, 5-1/4" deep for options 1c and 1d, and 7-1/2" deep for option 1e.

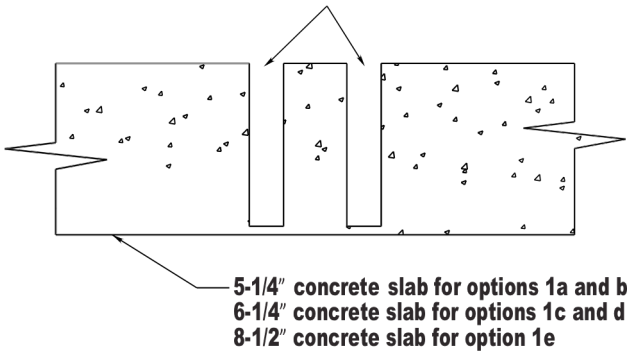
Special inspection may be required for epoxy set anchors into concrete.

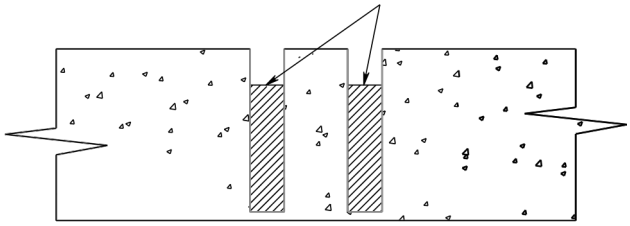
By core drilling a shallow 'pilot' 20mm hole first, it reduces the risk of a hole 'blowing out' at the top if only a 18mm masonry bit were used for tile or concrete. The holes must then be blown out with a compressor & air hose to remove all concrete dust (or hand blower and pump may also be used). Then use steel wire bottle brush to clean out the hole by inserting in and out a number of times until no dust is left in and on the side of the hole. Blow hole out again and insert finger into hole to make sure the sides of the hole are free of dust.
Insert vice with rods into hole to verify fit and depth. Fill each hole with epoxy resin. More than ¾. Approx 80% then verify.

Step 1: 20mm hole, 3/8" deep with diamond drill bit

Step 2: 18mm hole, depth as listed above with masonry drill bit

3/4 fill the two holes with



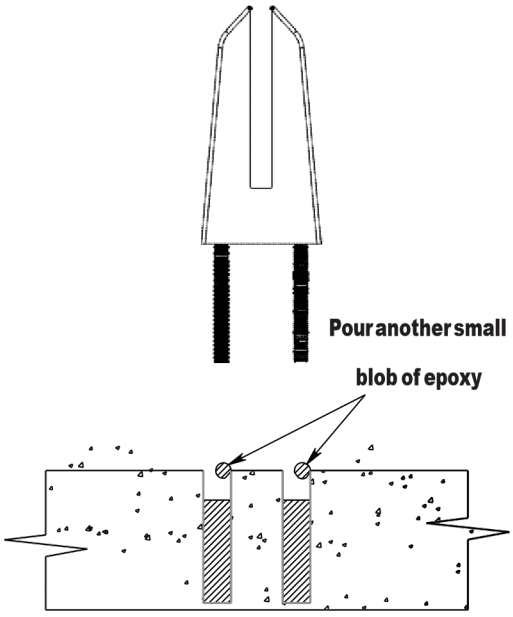


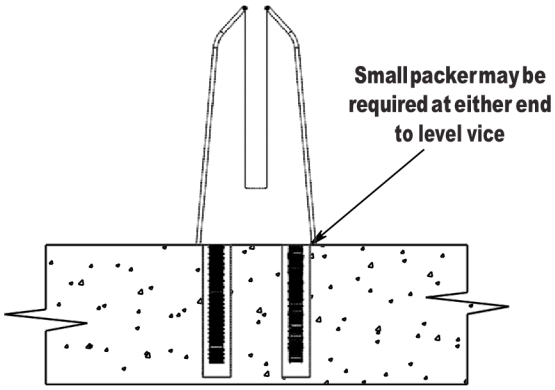
DRILLING HOLES FOR GLASS VICE®

Insert threaded rods into the two holes and then remove. This will eliminate the air pockets in the epoxy.

Inject additional epoxy at the top of the holes as need to verify full fill. Insert threaded rods into holes ready for plumbing and squaring. When positioning the Vice close to the edge of concrete slab, the center of the closest threaded rod must be no less then 2-3/8” for options 1a, b, c and d and 3-1/8” for option 1e (see table 1 on page 15) from the edge of the concrete slab.

Full preparation and epoxy installation must comply with Hilti instructions and ESR 2322. Special inspection may be required.

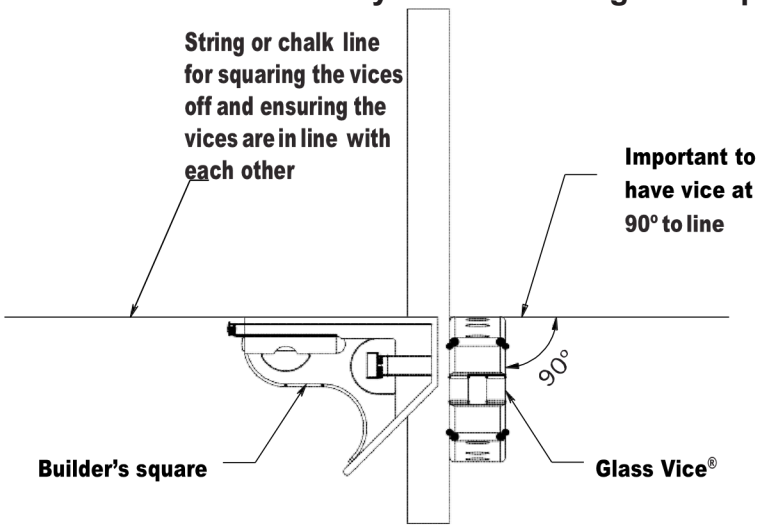


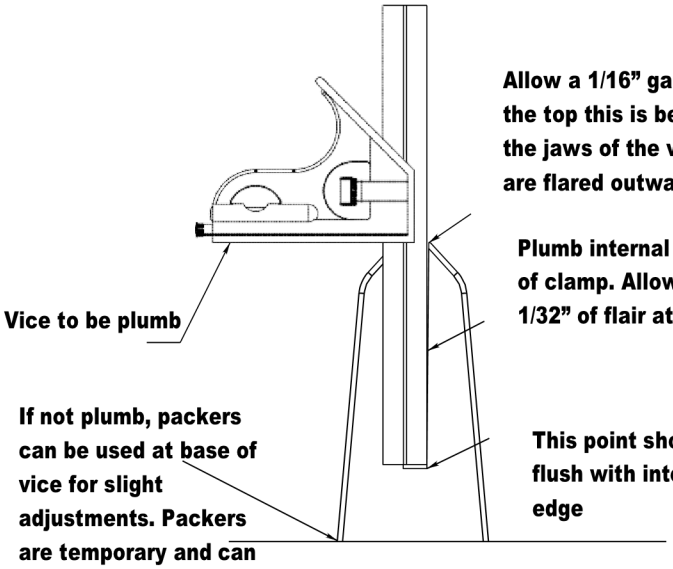


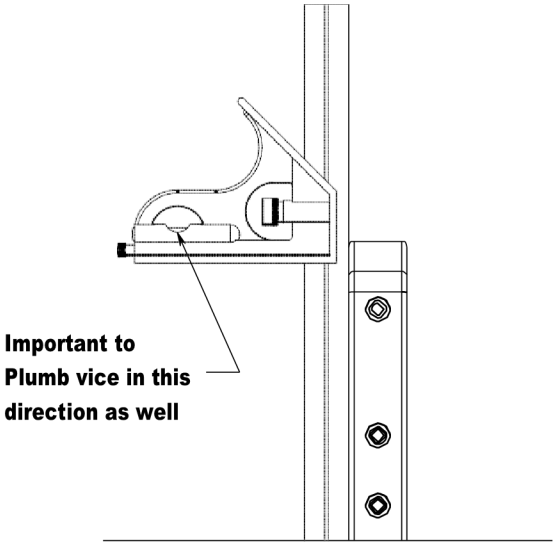
PLUMBING & LEVELLING OF GLASS VICE®

A builder's square is ideal for this step. The clamp must be square to the line (string line/ chalk line) and leveled on both sides.

Plumb and level each vice immediately after inserting into epoxy.

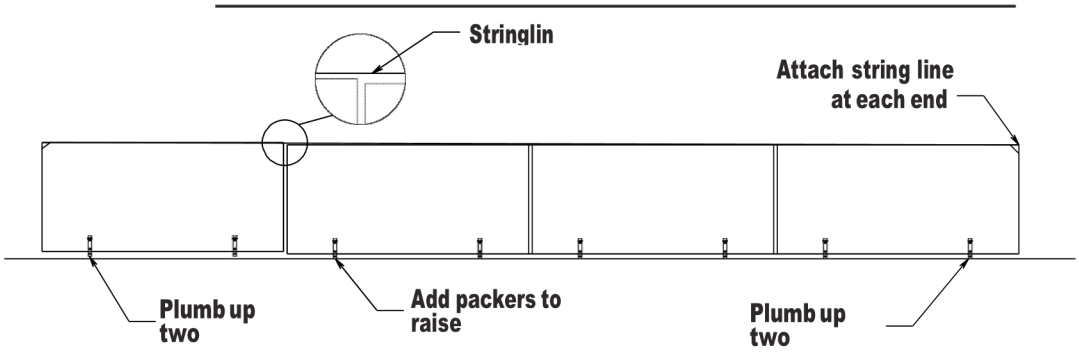






NOTE: **When a line of Glass Vice have been epoxied, carefully inspect the group of vices and ensure all are in alignment with each other. Using Hilti RE500 epoxy will give you plenty of time to readjust if necessary.**

PLUMBING UP MULTIPLE SHEETS IN A STRAIGHT LINE



When plumbing and leveling two or more glass panels, a string line should be used.

Once the glass panels are inserted into the Glass Vice, it is recommended to achieve even gap spacing between the glass panels.

Plumb up the two end panels first. Attach a string line from one end to the other at the top of the glass panels. Next, align the glass panels to the string line. This can be done by lifting and inserting the necessary number of packers under the glass in the Glass Vice, or remove packers if glass is too high.

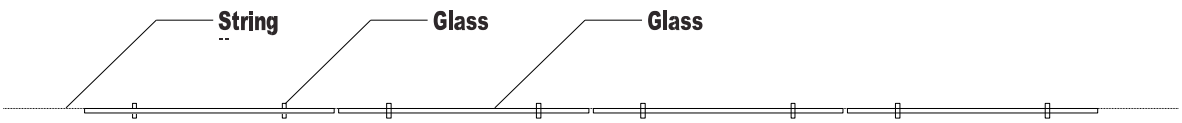
Always leave at least a 1/32” thick spacer between the glass and the Vice.

Once the top of the glass panels line up with the string line, the rest of the panels can be plumbed up with regard to the string line.

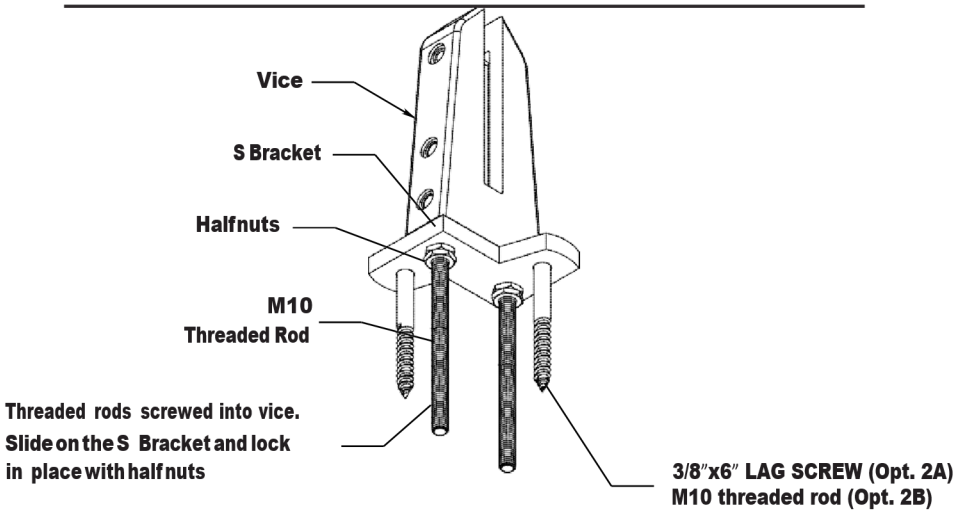
NOTE: When inserting glass into the Glass Vice, the glass panels must be plumb. (Not on an angle)

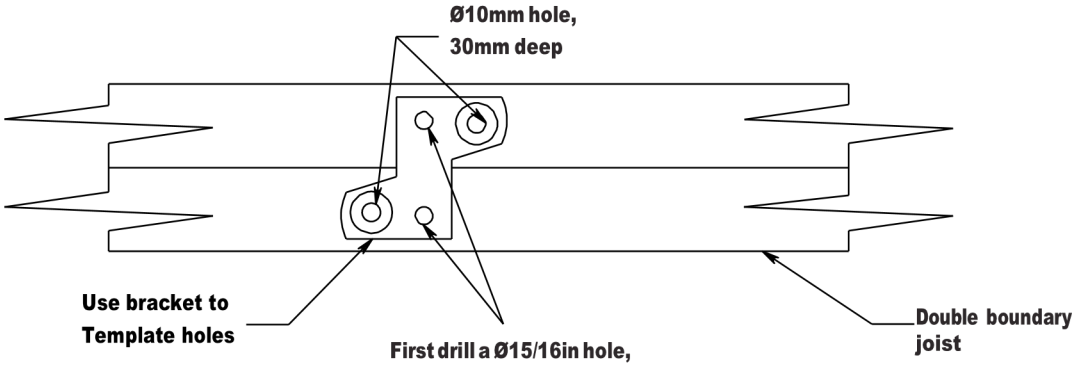
GLASS VICE®

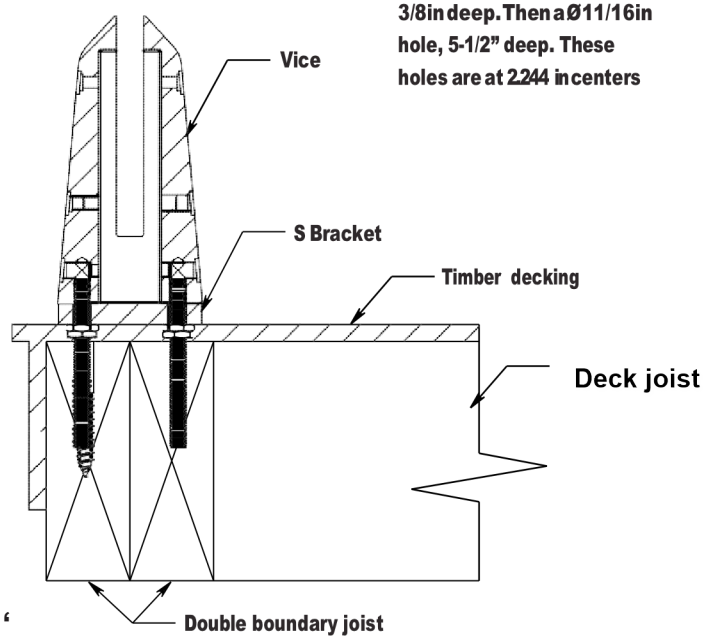
TOP VIEW OF VICE AND GLASS



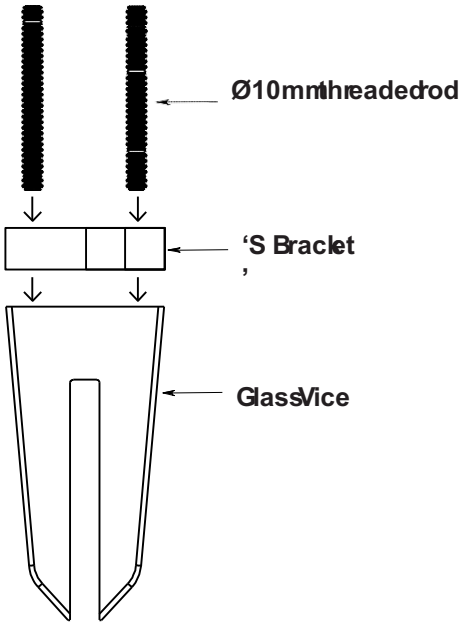
Have the string line on one edge of the glass. Once you have the heights adjusted this will give you a straight edge to line the rest of the panels up to.


Vice
S Bracket
Halfnuts
M10
Threaded Rod
Threaded rods screwed into vice.
Slide on the S Bracket and lock
in place with half nuts
3/8"x6" LAG SCREW (Opt. 2A)
M10 threaded rod (Opt. 2B)


Ø10mm hole,
30mm deep
Use bracket to
Template holes
First drill a Ø15/16in hole,
3/8in deep. Then a Ø11/16in
hole, 5-1/2" deep. These
holes are at 2.244 in centers
Double boundary
joist


Vice
S Bracket
Timber decking
Deck joist
Double boundary joist

‘S’ BRACKET INSTALLATION TO TIMBER DECKS



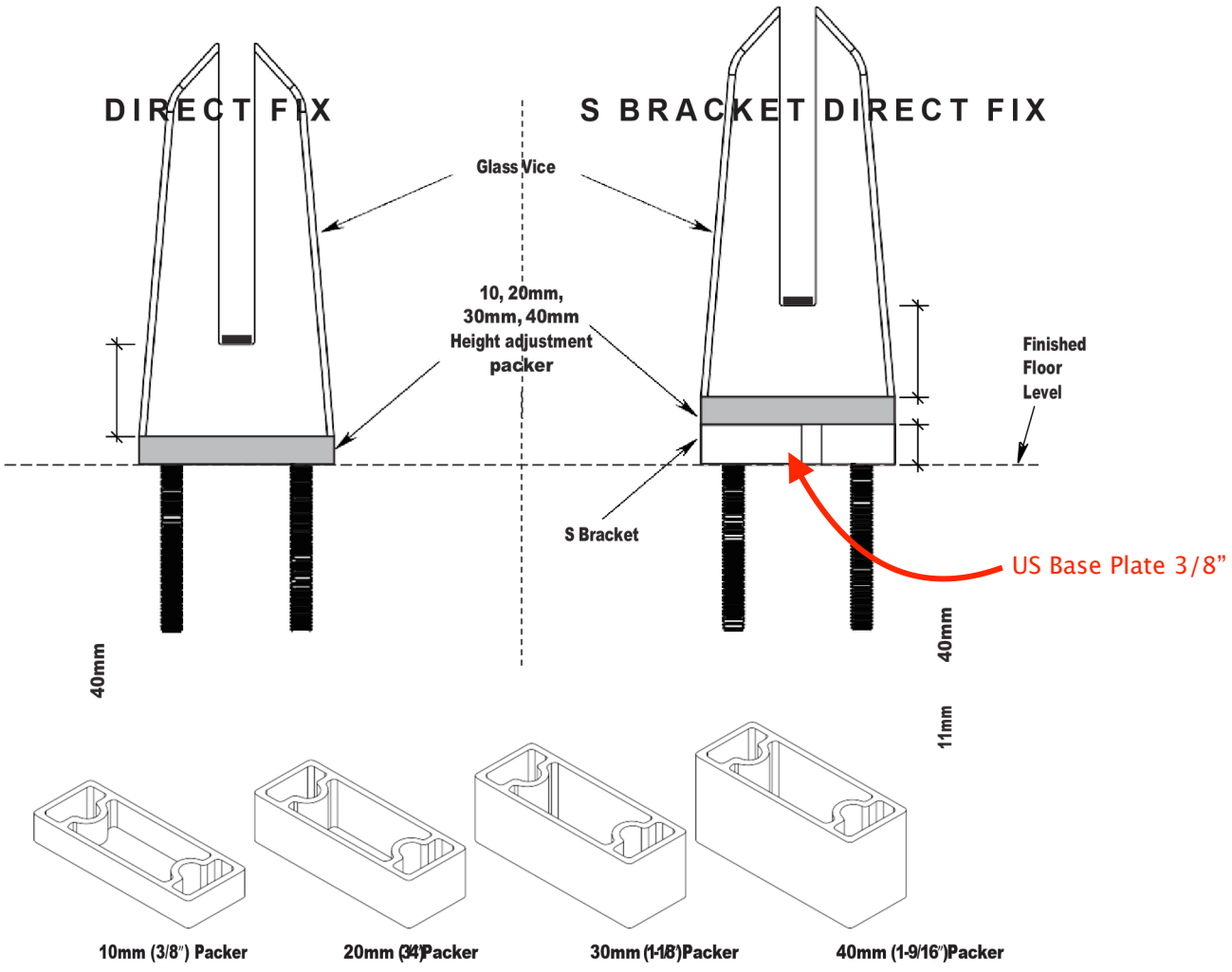
1. Turn Vice upside down and place ‘S’ bracket onto base of Vice. Screw threaded rod approx 3/8” into Vice, then use M10 hex nuts to secure ‘S’ bracket into position. Ensure hex nuts are secured very tightly.
2. Plan position of Vices as if installing a standard direct fix Vice.
3. Drill a Ø15/16” hole, 3/8” deep with timber spade bit. Then, with an Ø11/16” spade bit, drill a further 3/8” pilot hole. Into that pilot hole, use a standard steel drill bit and drill 51/2” deep overall.

Fill both holes with epoxy resin & insert Vice. Refer to previous section and follow same installation steps as the Direct Fix Vice. Allow 20 hours (minimum of 41°F to a maximum of 110°F) for epoxy to set.

Do not install glass or screw off ‘S’ bracket with timber coach screw until the following day. After leaving epoxy to set for 20 hours, screw in lag screws and install glass.

The combination of epoxy & lag screws with the Base Surface Plate is the ultimate timber deck installation system. U.S. uses a base plate, 4 screw hole adapter. Not “S” bracket. DETAILS IN ICC REPORT. ICC has details for screws only, no Epoxy needed.

HEIGHT ADJUSTMENT PACKERS



Stainless steel packers fit seamlessly under the Direct Fix Vice and can be used with base plate bracket installations also.
Packers should be used when there is fall in the slab or deck you are installing to. Guide to Use:

Determine where each Glass Vice will be installed. Take a measurement off all between one Vice to the next.

0 to 10mm (0 to 3/8”) fall – no packer required

10 to 20mm fall (3/8 to 3/4”) – use 10mm (3/8”) packer

20 to 30mm fall (3/4” to 1-1/8”)– use 20mm (3/4”) packer

30 to 40mm fall (1-1/8 to 1-9/16”)– use 30mm (1-18”) packer

40 to 50mm fall (1-9/16 to 2”)– use 40mm (1-9/16”) packer

NOTE: If there is only 15mm (9/16”) of fall over the whole job, no packers are required.

SIDE FIXED (FASCIA MOUNTED) OPTION USING THE ARCHITECTURAL VICE

The architectural Glass Vice® bracket may be used to fascia mount (side fix) the balustrade to concrete, wood or metal decks.

For installation to deck fascia (side)

1. **Verify that deck fascia beam or side is structurally able to support the bracket and the imposed loads.**

2. **Align brackets at required spacing and mark holes for bracket anchors.**

a) For installation to concrete drill 12mm / ½” diameter holes required depth.

Clean and prepare holes per Hilti installation instructions and ESR-2322.

Dry fit anchor rods and bracket to verify fit.

Install Hilti RE500-SD epoxy per Hilti instructions and ESR-2322.

Special inspection of concrete anchors may be required. b)
For installation to wood-

For lag screws drill 3/8” diameter pilot hole then install 16mm (5/8”) SS lag screws, length as required.

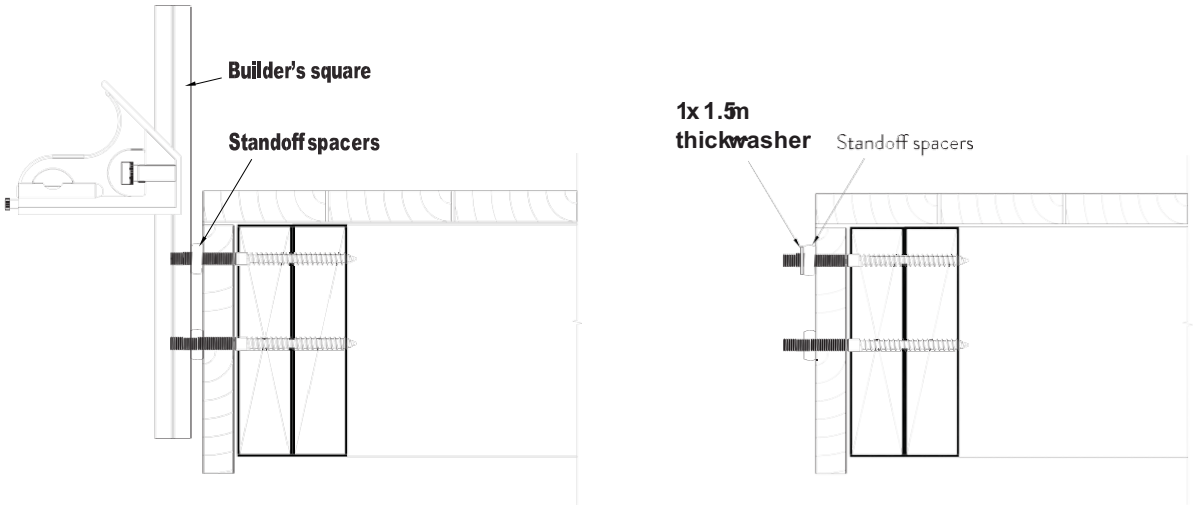
For through-bolts – drill 7/16” hole through wood beam. Install 3”x3/8”x5.25” flat bar standoff between bracket and wood framing and on backside of beam under nuts on 10mm SS bolts. Snug tighten nuts. c) For installation to metal framing- Drill 7/16” diameter hole for 10mm SS bolts.

Install required spacers between bracket and metal beam.

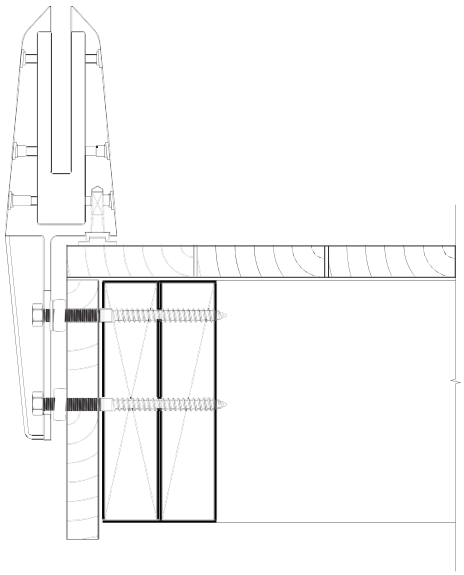
Snug tighten nuts.

May be installed on studs welded to steel beams.

NSTALLATION REQUIREMENT WHEN FITTING ARCHITECTURAL VICE WITH STANDOFF SPACERS



Firstly, plumb up the two standoffs. Then place 1x M10 1.5mm thick stainless steel washer on top of the rod/lag screw. Or Wind Standoff



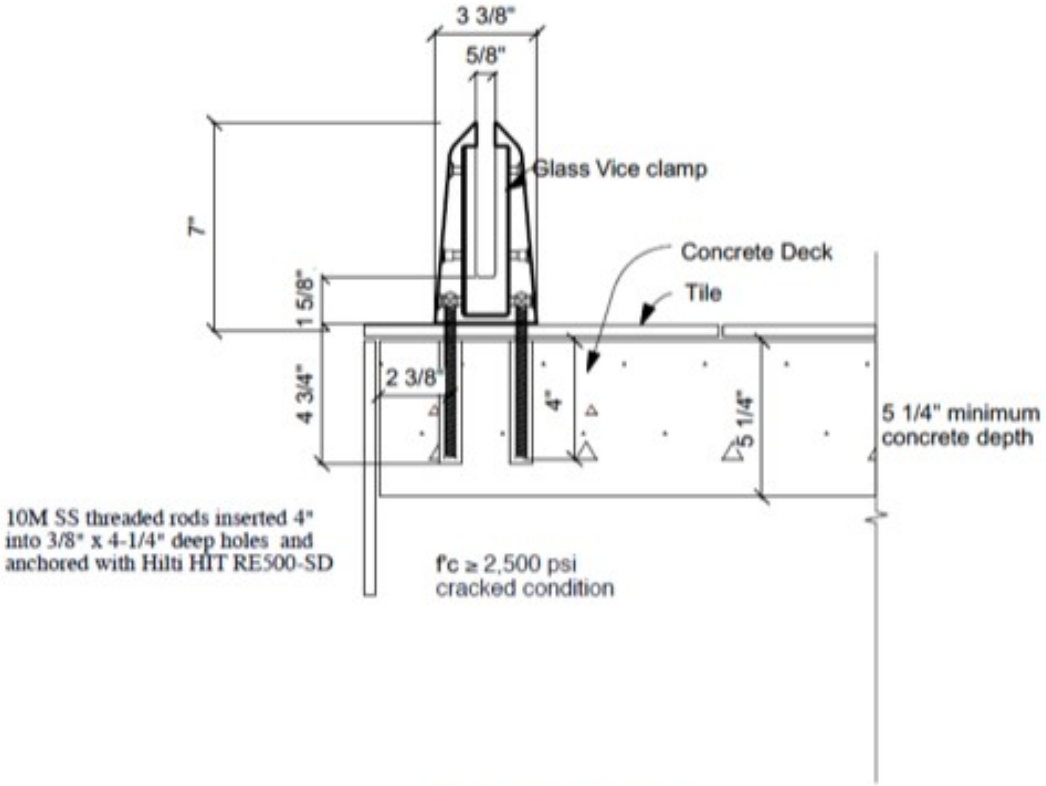
*For illustration purposes only

Attach the architectural vice to the rods/lag screws.

NOTE: Because the architectural vice is a double casting, it is slightly out of plumb. Putting the 1.5mm washer on top of the threaded rod or lag screw corrects this.

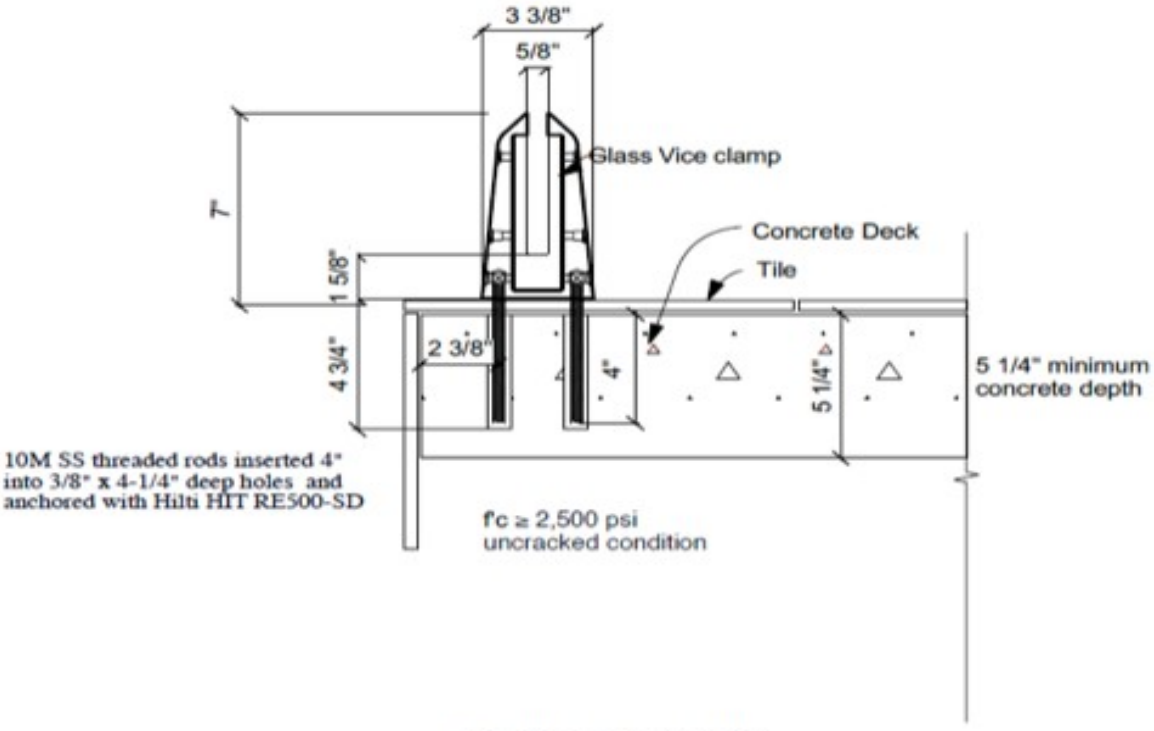
System Mounting Option Number and Figure		Glass Clamp Material Specification	Substrate	Anchorage to Substrate Refer to attached figures
1a Figure 4	Direct Fix Vice	Glass Vice Duplex 2205	Concrete - cracked $f'_c \geq 2,500$ psi	10M SS threaded rods with 4" embedment set Hilti HIT-RE500-SD per ESR-2322
1b Figure 5	Direct Fix Vice	Glass Vice Duplex 2205	Concrete - uncracked $f'_c \geq 2,500$ psi	10M SS threaded rods with 4" embedment set Hilti HIT-RE500-SD per ESR-2322
1c Figure 6	Direct Fix Vice	Glass Vice Duplex 2205	Concrete - cracked $f'_c \geq 2,500$ psi	10M SS threaded rods with 5" embedment set Hilti HIT-RE500-SD per ESR-2322
1d Figure 7	Direct Fix Vice	Glass Vice Duplex 2205	Concrete - uncracked $f'_c \geq 2,500$ psi	10M SS threaded rods with 5" embedment set Hilti HIT-RE500-SD per ESR-2322
1e Figure 8	Direct Fix Vice	Glass Vice Duplex 2205	Concrete - cracked $f'_c \geq 2,500$ psi	10M SS threaded rods with 7-1/4" embedment set Hilti HIT-RE500-SD per ESR-2322
2A Figure 9	S Bracket	Glass Vice 316 Direct Fix Clamp	Wood, $G \geq 0.43$ Any MC	10M SS threaded rods with 4" embedment set Hilti HIT-RE500-SD and 3/8" x 6" lag screws
2B Figure 10	Direct Fix Vice	Glass Vice Duplex 2205	Wood, $G \geq 0.43$ Any MC	10M SS threaded rods with 4" embedment set Hilti HIT-RE500-SD
3Aa Figure 11	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Concrete - cracked $f'_c \geq 3,000$ psi	10M SS threaded rods with 7-1/2" embedment set Hilti HIT-RE500-SD per ESR-2322 1.77" top edge distance.
3Ab Figure 11	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Concrete - cracked $f'_c \geq 3,000$ psi	10M SS threaded rods with 7-1/2" embedment set Hilti HIT-RE500-SD per ESR-2322 2.165" top edge distance
3Ac Figure 11	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Concrete - uncracked $f'_c \geq 3,000$ psi	10M SS threaded rods with 7-1/2" embedment set Hilti HIT-RE500-SD per ESR-2322 1.77" top edge distance
3B Figure 12	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Wood, $G \geq 0.43$ Any MC	10M SS bolts through wood beam with 3"x5-1/4" bearing bars.
3Ca Figure 13	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Wood, $G \geq 0.50$ MC $\geq$ 19%	16mm SS Lag screws with 6.79" minimum embedment to primary member
3Cb Figure 13	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Wood, $0.43 \leq G \leq 0.49$ MC $\geq$ 19%	16mm SS Lag screws with 7.5" minimum embedment to primary member
3Cc Figure 13	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Wood, $G \geq 0.50$ MC $\leq$ 19%	16mm SS Lag screws with 4.89" minimum embedment to primary member
3Cd Figure 13	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Wood, $0.43 \leq G \leq 0.49$ MC $\leq$ 19%	16mm SS Lag screws with 5.41" minimum embedment to primary member
4 Figure 14	Direct Fix Vice	Glass Vice Duplex 2205	Steel or aluminum Designed for loads	M10 SS threaded rods with nut, length as required.
5 Figure 15	S Bracket	Glass Vice 316 Direct Fix Clamp	Steel or aluminum Designed for loads	M10 SS bolt ASTM F738M or equivalent strength length as required.
6 Figure 16	Architectural Bracket	Glass Vice 316 Direct Fix Clamp	Steel or aluminum Designed for loads	M10 SS bolt ASTM F738M or equivalent strength length as required.

Option 1A Detail

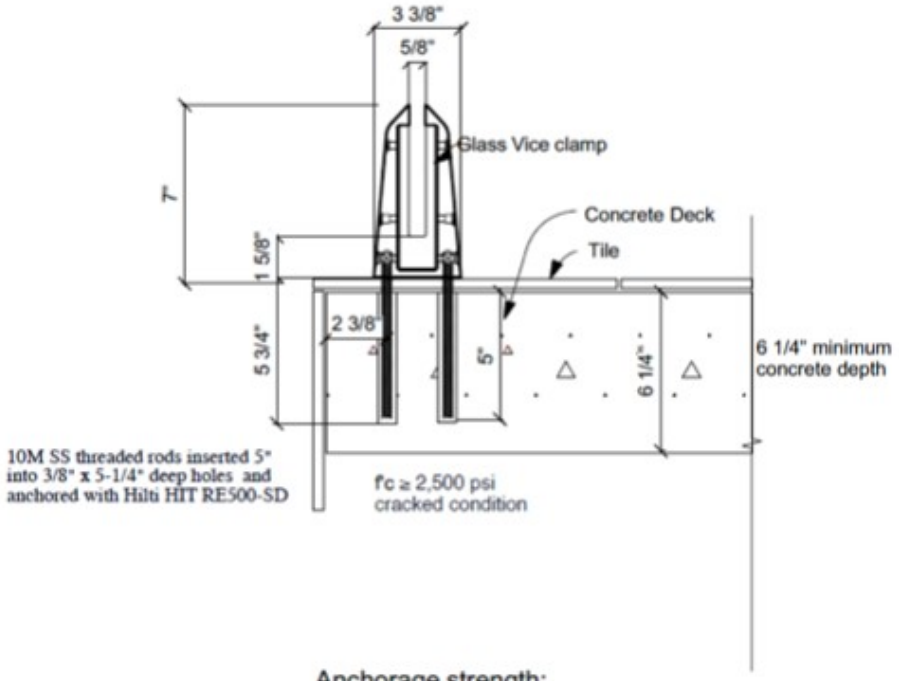


Anchorage strength:
ϕM_n = 5,484 in-lb
M_a = 3,428 in-lb

Option 1B

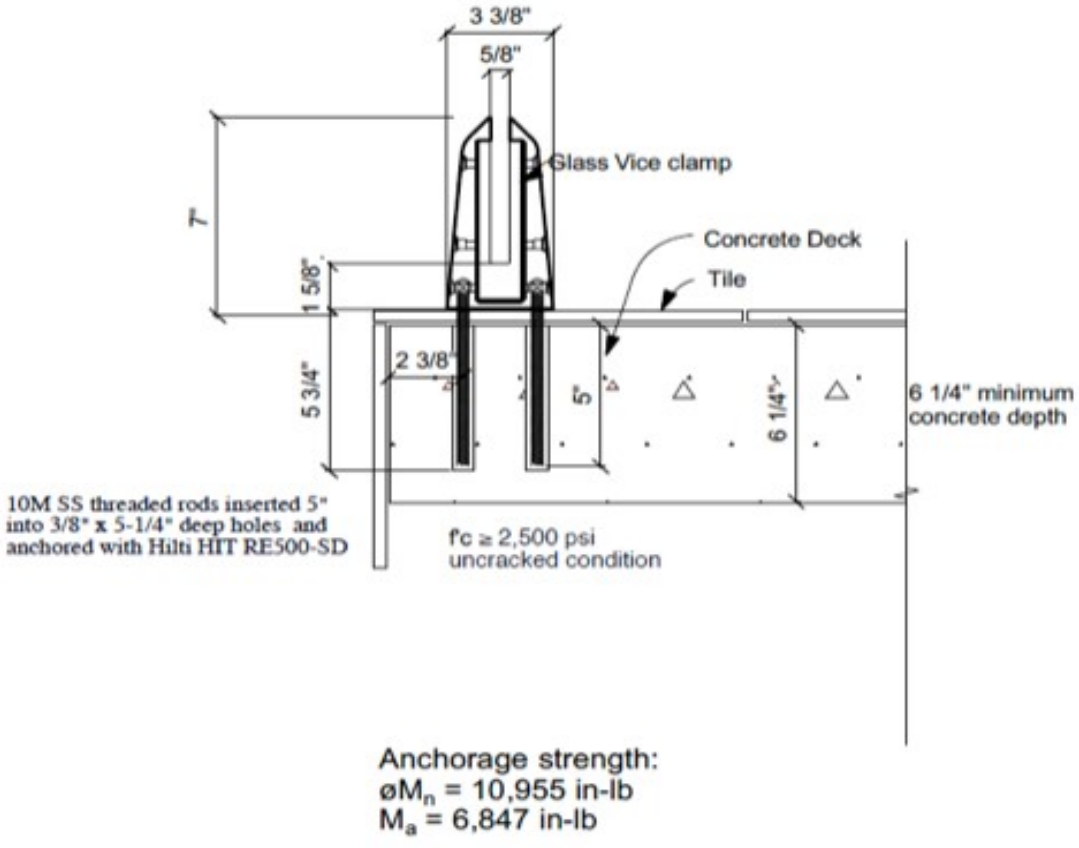


Anchorage strength:
ϕM_n = 9,411 in-lb
M_a = 5,882 in-lb



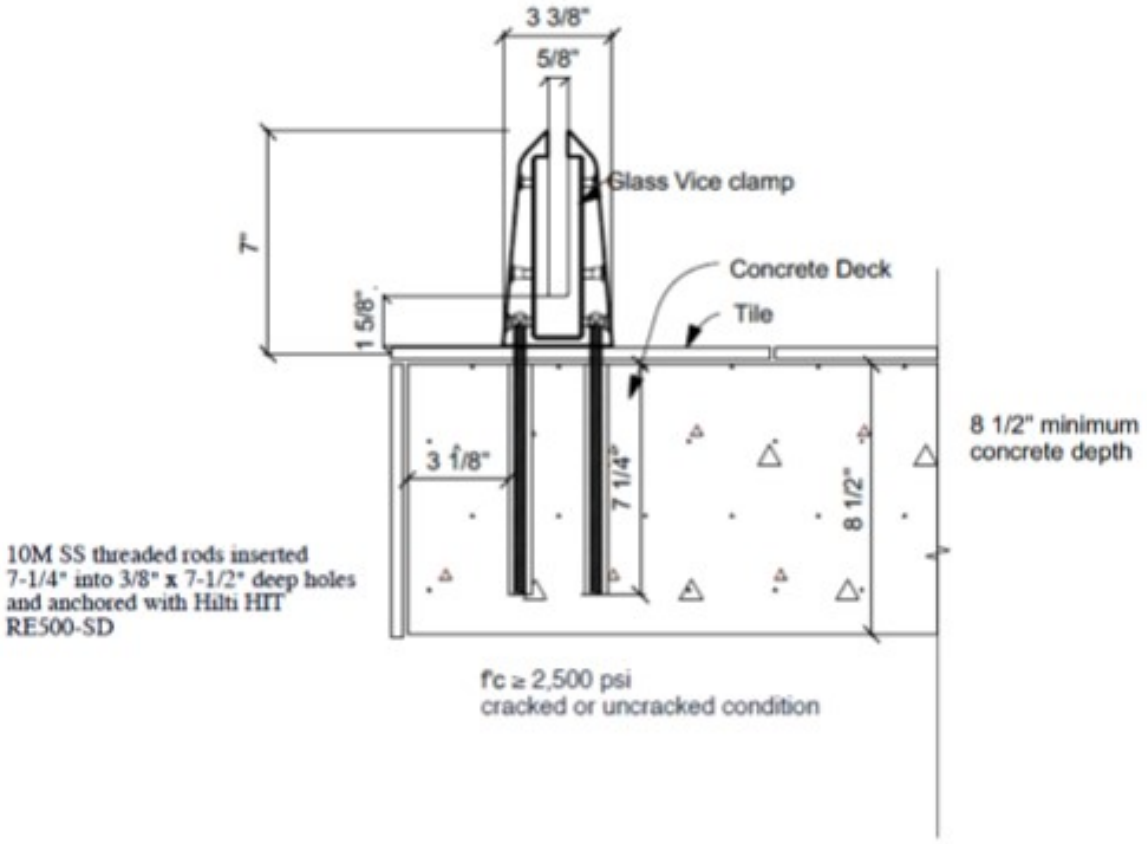
Anchorage strength:
ϕM_n = 6,869 in-lb
M_a = 4,293 in-lb

Option 1D



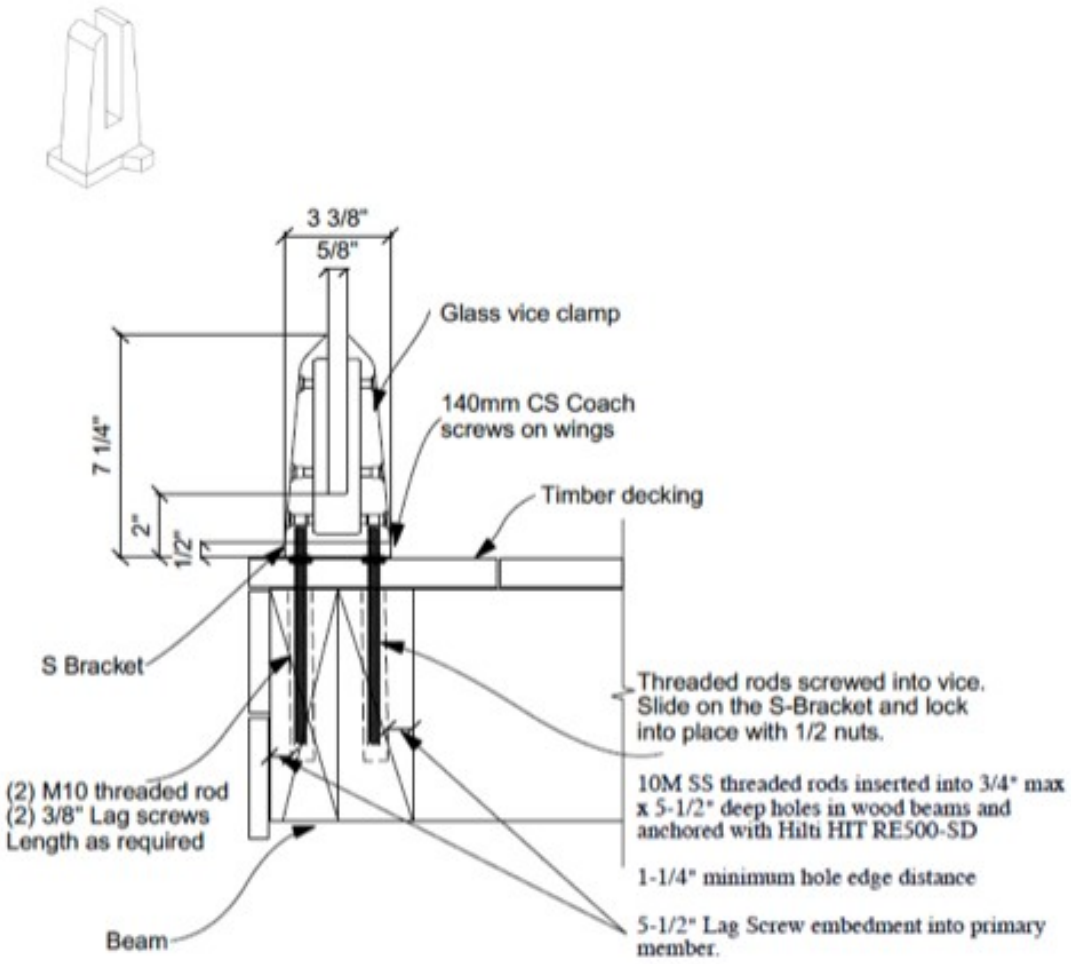
Anchorage strength:
ϕM_n = 10,955 in-lb
M_a = 6,847 in-lb

Option 1E Detail

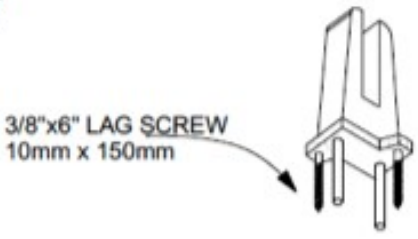


Anchorage strength:
ϕM_n = 10,932 in-lb
M_a = 6,833 in-lb

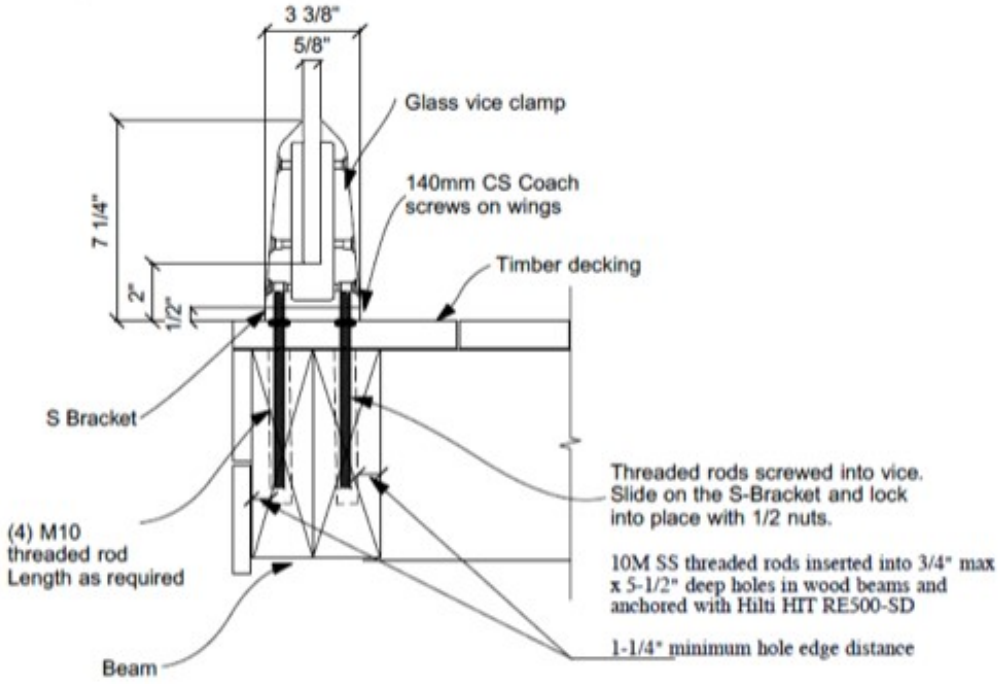
Option 2A



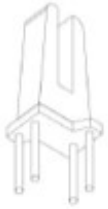
Anchorage strength:
M_a = 12,102 in-lb



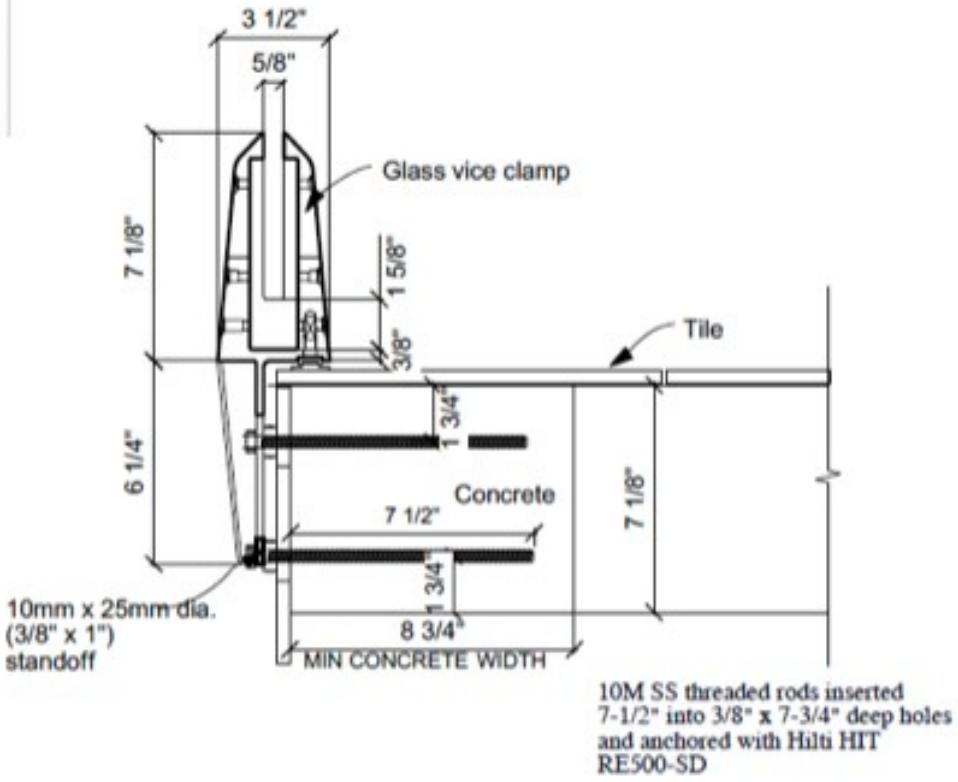
Option 2B Detail



Anchorage strength:
M_a = 8,912 in-lb

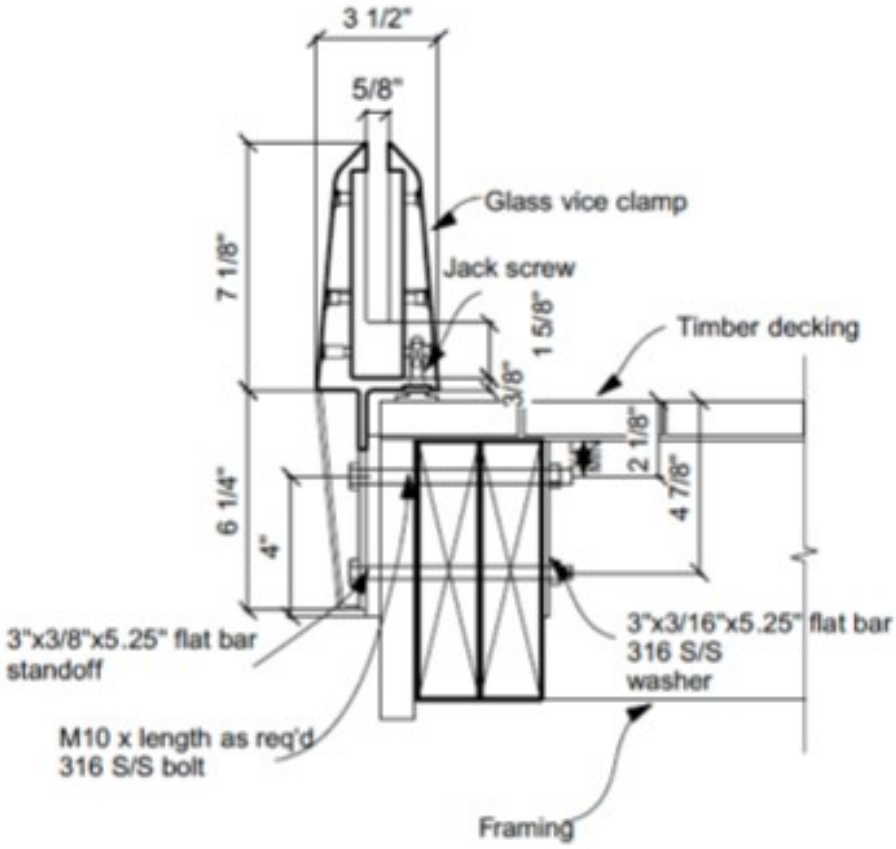


Option 3A Detail



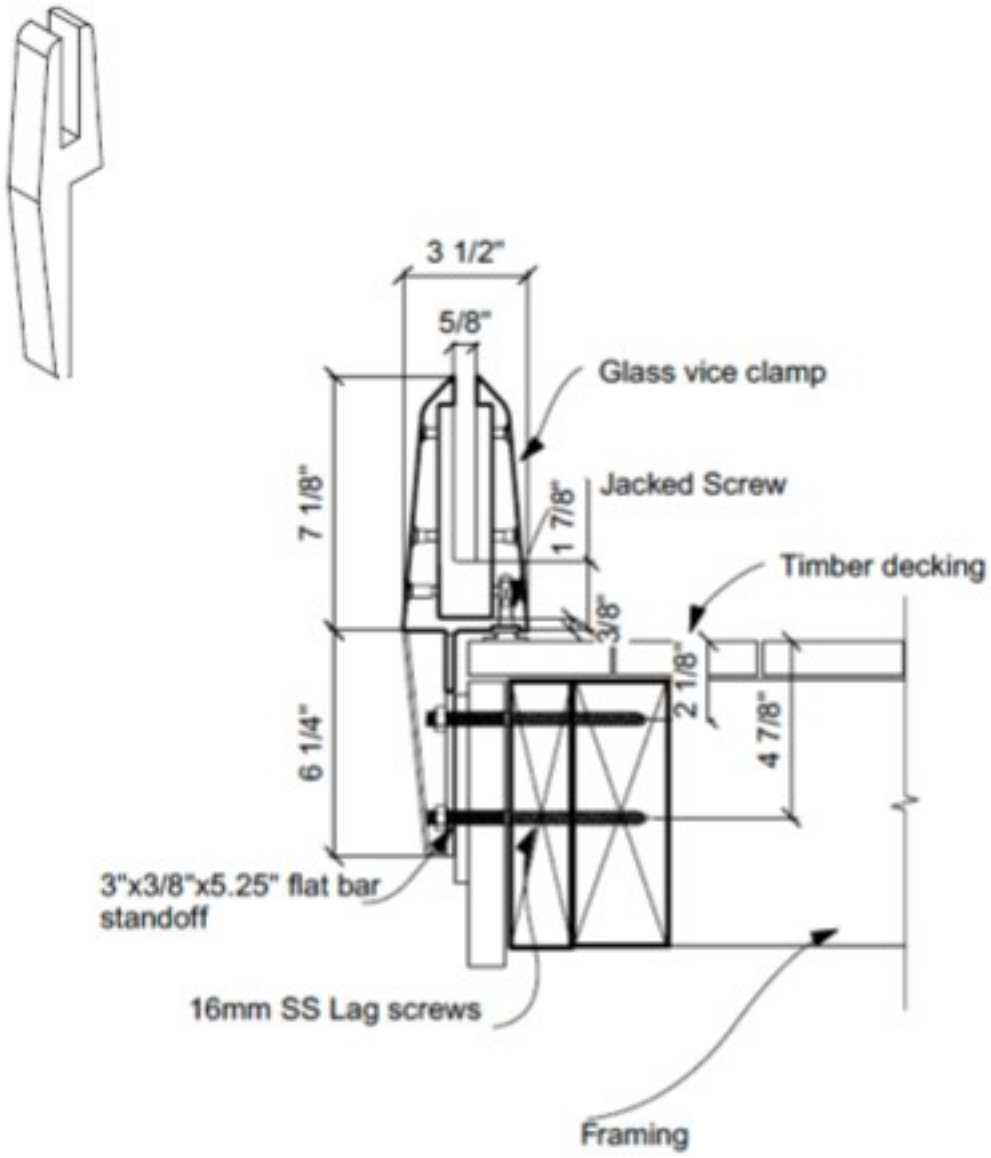
Option	Anchorage strength:
3Aa Cracked conc. w/ 1-3/4" min edge dist	ϕM_n = 8,042 in-lb M_a = 5,026 in-lb
3Ab Cracked conc. w/ 2-3/16" min edge dist	ϕM_n = 8,617 in-lb M_a = 5,386 in-lb
3Ab Uncracked conc. w/ 1-3/4" min edge dist	ϕM_n = 9,960 in-lb M_a = 6,225 in-lb

Option 3B Detail



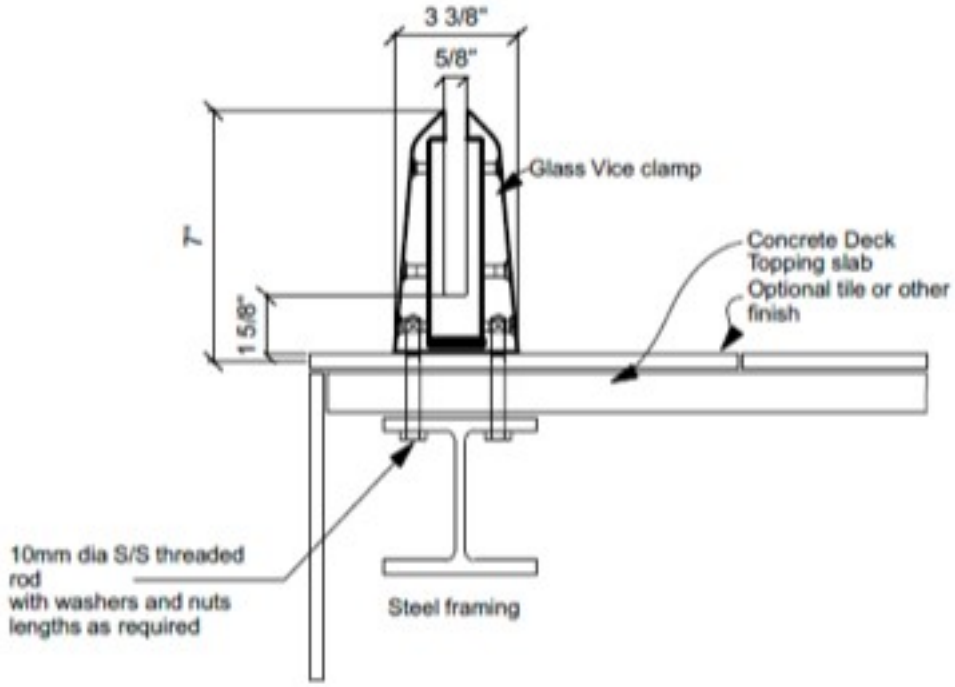
Anchorage strength:
M_a = 10,450 in-lb

Option 3C Detail



3Ca 6.79" Embedment for G = 0.5 (DFL/SP/SCL)	Any MC	M_a = 7,957 in-lb
3Cb 7.50" Embedment for G = 0.43 Hem-fir	Any MC	M_a = 7,957 in-lb
3Cc 4.89" Embedment for G = 0.5 (DFL/SP/SCL)	MC≤ 19%	M_a = 11,367 in-lb
3Cd 5.41" Embedment for G = 0.43 Hem-fir	MC ≤ 19%	M_a = 11,367 in-lb

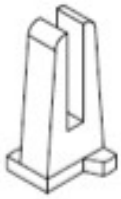
Option 4 Detail

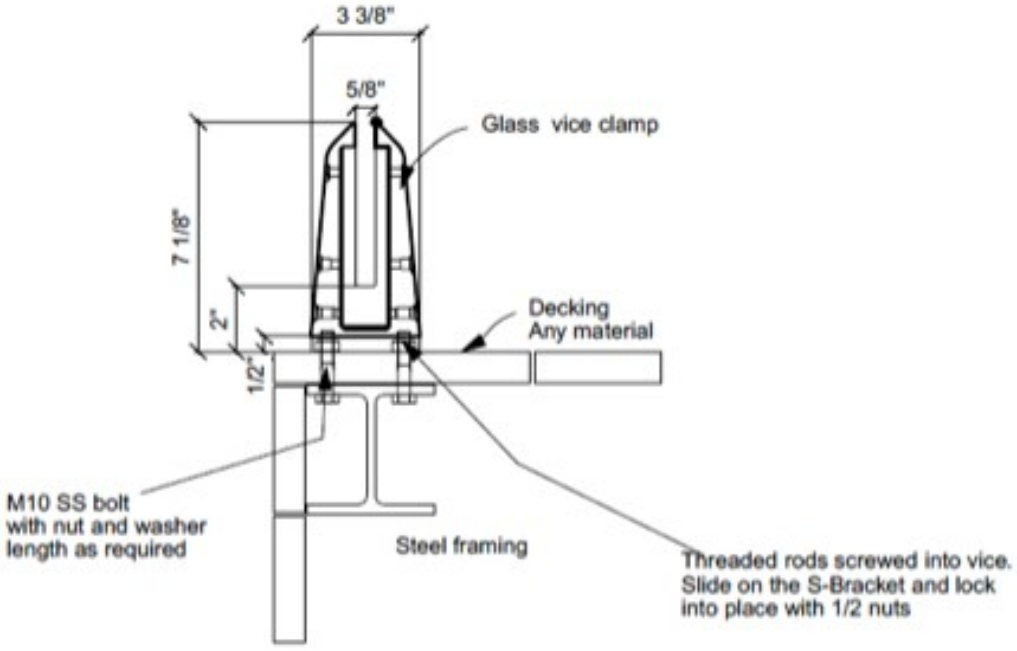


Anchorage strength:
ϕM_n = 14,390 in-lb
M_a = 8,994 in-lb

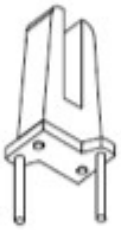
Option 5 Detail

GLASS VICE®

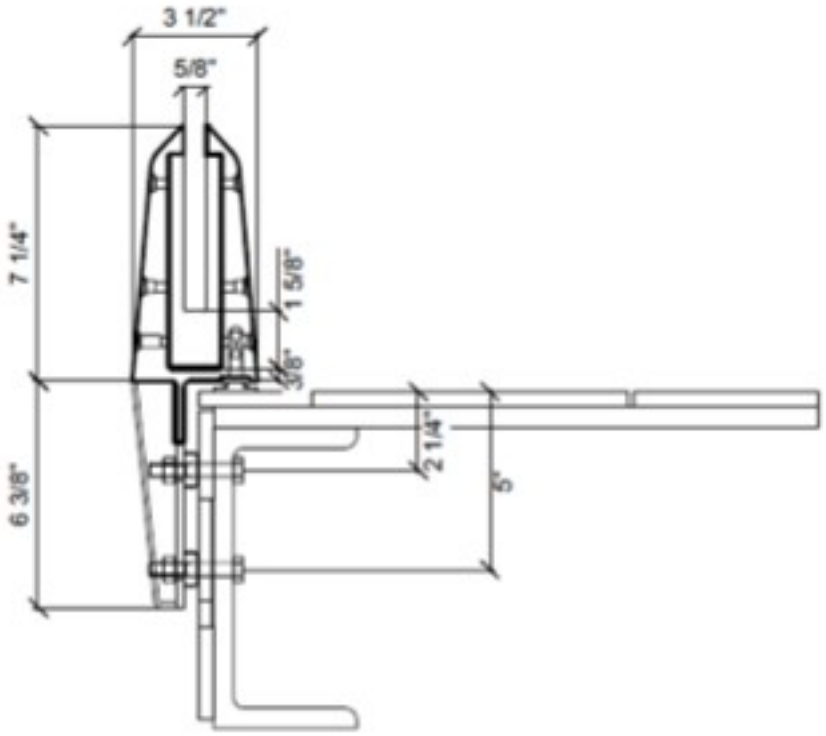




Anchorage strength:
ϕM_n = 14,390 in-lb
M_a = 8,994 in-lb



Option 6 Detail



Anchorage strength:
ϕM_n = 17,672 in-lb
M_a = 11,045 in-lb