



DRAFT 03/2017

The JVI Mini-V

User Guidelines

This Document is still under review
and JVI appreciates any comments
you might have.

Please email comments to Heidi Ziemann, PE (heidi@jvi-inc.com)





DRAFT 03/2017

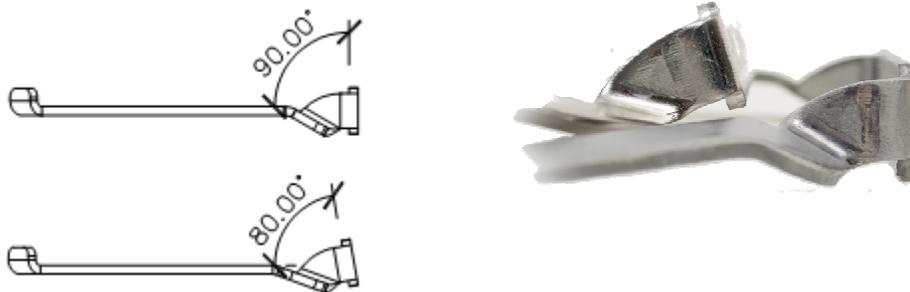
INTRODUCTION

JVI designed the Mini-V for use as shear and alignment connections between precast concrete elements such as field topped double-tee flanges, field topped slabs, and wall panels. The Mini-V is not intended to be used in factory topped double tees. The mini-v can be used in roof double tees that do not receive field topping provided the roof loading is not cyclic in nature.

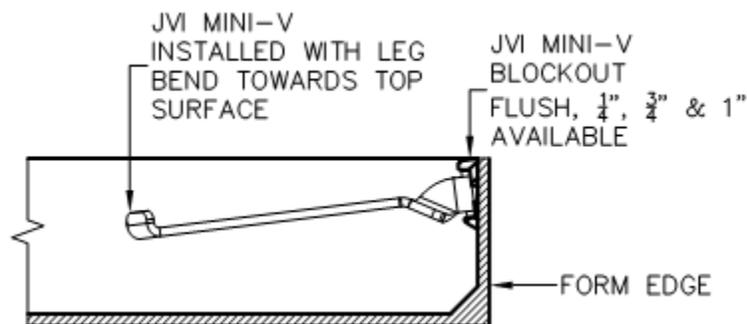


ENGINEERING

1. The Mini-V is available with a 90° face plate (square) and an 80° face plate (angle). To determine the appropriate Mini-V to use, the form slope, type of attachment and available blockouts should be considered.

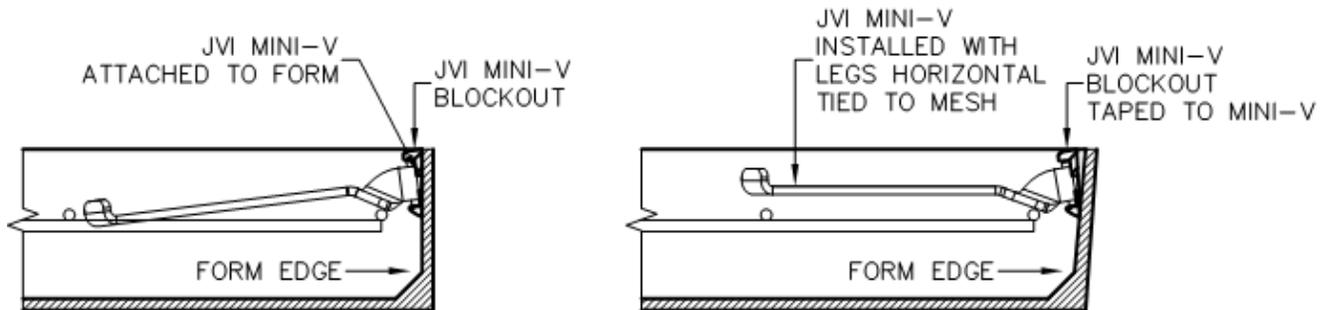


2. Space the Mini-V to provide capacity for all the forces the structure will encounter. For field topped conditions, the Mini-V can provide erection stability and the topping can be considered to transfer all of the required diaphragm forces. For field topped conditions, if the mini-v is considered to contribute to the resistance of diaphragm forces, strain compatibility should be considered when determining the mini-v contribution.
3. Detail the Mini-V in its proper position. The Mini-V should be installed so the legs are turned toward to the top surface



ENGINEERING

4. The use of the JVI Mini-V blockout (flush, 1/4", 3/4" or 1"), or any other similar, four-sided setting device, is recommended. The Mini-V face plate must be in full contact with the blockout. The blockout creates space around the edges to allow for expansion of the faceplate during welding. The Mini-V can be attached to the side form directly or the blockout can be taped to the face of the mini-v and the mini-v tied to reinforcing with the legs orientated in a horizontal position. Specify on production drawings the preferred method of attachment.



5. The JVI Mini-V should be detailed to with consideration of the interaction/interference of any provided welded wire reinforcing or trim steel. The mini-v may be placed with either the welded wire reinforcement above or below the mini-v.
6. Design the weld and the erection bar for the required forces. The size, length, and type of weld should be specified for the type of erection bar used. The erection bar can be flat or round. Various erection bar widths will be required to account for the varying joint widths. The erection bar length should not be less than the length of the weld. Misalignment between adjacent Connectors can occur. To compensate for this condition, longer erection bars will be required. The mini-v was testing using a 3/16" fillet weld x 4" long. The detailed weld need not match that of the tested weld. The supplied weld can be as provided as required for resist the require forces as determined by the responsible engineer. Over-welding is not acceptable and should be indicated as such on the contract and shop/erection drawings. Over-welding creates excessive heat which can lead to excessive expansion of the material and introduce cracking at the connection.
7. The flat erection bars used for the field connection should have a minimum thickness of 3/8 in (10mm). The maximum width of the erection bar should be governed by the actual size of the joint and the type of weld. Never detail or use multiple erection bars between adjacent Mini-vs. Joints requiring erection bars wider than 1" (25mm) should be investigated by a responsible engineer to determine an appropriate connector strength.
8. Design and perform all welds for connections in accordance with the latest edition of the American Welding Society (AWS) manual.
9. Consult a precast concrete specialty engineer if greater vertical shear and tension capacities are desired.
10. Develop, test and approve a welding procedure specification prior to each project. Each field welder shall be pre-qualified for this welding procedure. A fillet weld should be specified for the flat erection bar connection. A flare bevel weld should be specified for the round erection bar connection.



ENGINEERING

11. Have the certified welder, the welding inspector, the Engineer of Record, and the precast concrete specialty engineer review the welding procedures prior to any welding. Sample welding of the connection should be performed, reviewed and approved. All specifications and details indicated on the construction drawings shall be followed. Any inconsistencies in the construction documents should be brought to the attention of the Engineer of Record. The welder shall not oversize the weld or weld length.
12. Include flat or round erection bars of various widths on field material hardware lists.
13. JVI offers stainless steel in 201LN. The 201LN is an austenitic stainless steel stronger and similar in durability to 304 stainless steel. The welding of 201LN is the same as 304. 201LN can be welded to 304. For more information on 201LN and 304 stainless steel, visit the JVI web site: <http://www.jvi-inc.com>
14. In lieu of stainless steel, JVI offers the Mini-V in SAE HSLA 045XLF with a JVI Platinum J-Finish. The Platinum J-Finish is a 3 step process with [1] Zinc Plate Per ASTM B633 FE/Zn12 TYPE II, SC3 Severe, (minimum thickness 0.0005"), [2] Trivalent Clear Chromate (RoHS and ELV compliant), and [3] sealer.
15. When using the platinum J-Finished Mini-V, an application of a zinc-rich coating (ZRC) should be required after welding for corrosion protection.



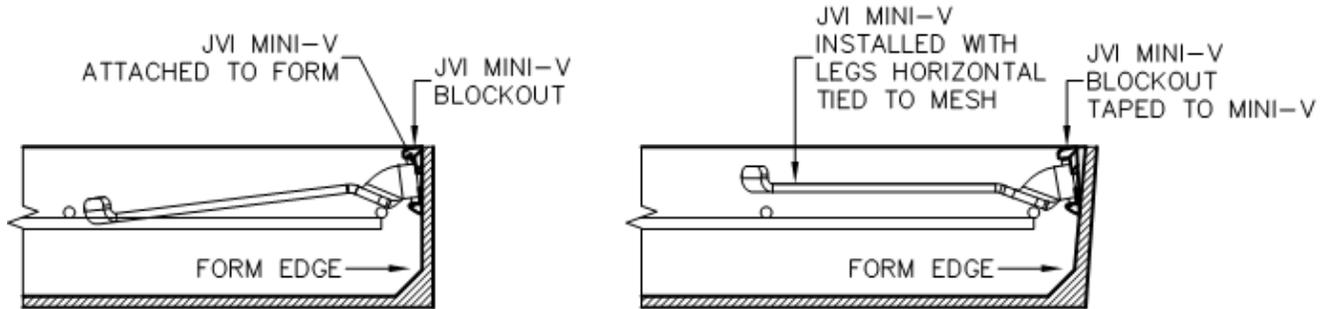
DRAFT 03/2017

PURCHASING

1. When ordering please specify Mini-V Square or Mini-V Angle, and stainless steel or J-finish.
2. Select JVI blockouts to fit the product design and casting form. Please specify the type of blockout. Flush, 1/4", 3/4" and 1" blockouts are available. If not using the JVI blockouts, have the blockouts fabricated with concrete relief on all sides. The relief allows for expansion of the Mini-v when the connection is made in the field. Verify required blockouts with engineering and production.
3. Order various width field erection bars to accommodate field-placement conditions. Flat or round erection bars can be used. Coordinate erection bar sizes with engineering and erection.
4. JVI offers stainless steel in 201LN. The 201LN is an austenitic stainless steel stronger and similar in durability to 304 stainless steel. The welding of 201LN is the same as 304. 201LN can be welded to 304. For more information on 201LN and 304 stainless steel, visit the JVI web site: <http://www.jvi-inc.com>

PRODUCTION

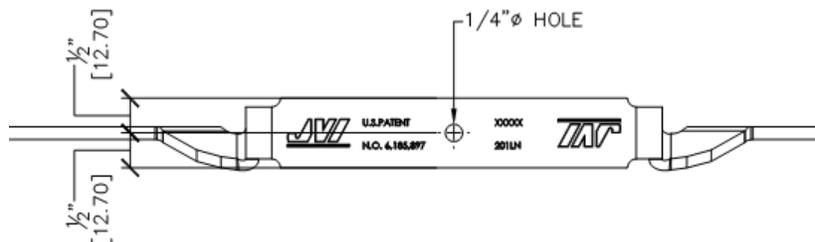
1. Install the Mini-V and specified blockout in the form as detailed on the production drawings. The Mini-V may be detailed directly attached to the form or detailed tied into the reinforcing with the legs of the mini-v placed horizontally.



2. For attachment directly to the form, the mini-v can be attached through predrilled holes in the rail and the use of a plastic toggle anchors or similar. Please see video for example of attachment to form rail using predrilled holes and plastic anchor. This video show the vector connector, but the concept can be applied to the mini-v.

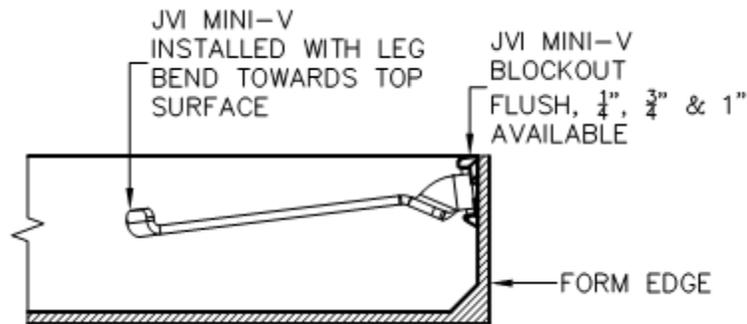


Additionally, a bolt could be placed through the side rail and attached using a wing nut on the other side. These bolts should be removed after preset and prior to curing of the precast concrete product. To provide additional support and prevent rotation, as the mini-v has only a single hole for attachment, the legs can be tied to the supplied reinforcing. The hole provided in the mini-v is 1/4" diameter, centered in the faceplate.





3. Unsecured fastening, improper placement, and plant personnel walking in the formwork near the location of the mini-V can cause the mini-v to be oriented incorrectly.
4. The Mini-V should be installed as detailed in the production drawings, however the mini-v is typically installed with the leg bend orientated in the upward direction. The mini-v can be installed with the welded wire fabric either above or below the mini-v. Install the mini-v as detailed per the provided production drawings.

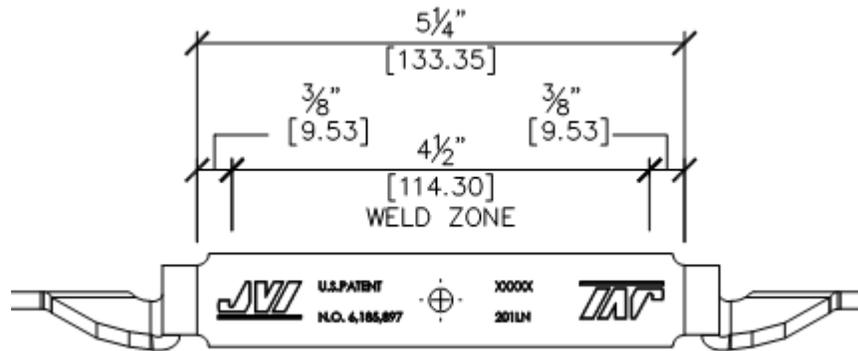


5. Check the mini-v positioning in the form prior to concrete placement. Any improper orientation should be corrected.
6. Clean and keep clear all edges of the mini-v from any concrete. The JVI setting blockout will keep these edges clean if fastened properly and are in good condition.
7. Do not remove or cut any reinforcement in or around the location of the mini-v. The size and detail of the reinforcement may be adjusted only after receiving approval from a precast concrete specialty engineer.
8. Prior to concrete placement, inspect the mini-v. Inspection should be a routine Quality Assurance (QA) operation and be a part of your PCI Plant Certification Program and Quality Systems Manual.
9. Once the precast concrete product is stripped from the formwork, remove the setting blockout and then inspect the mini-v for cleanliness and proper positioning. If necessary, remove any concrete paste from the face and all edges of the mini-v. Faceplate cleanliness minimizes the need for the field welder to clean the Mini-v prior to the welding process.



ERECTION

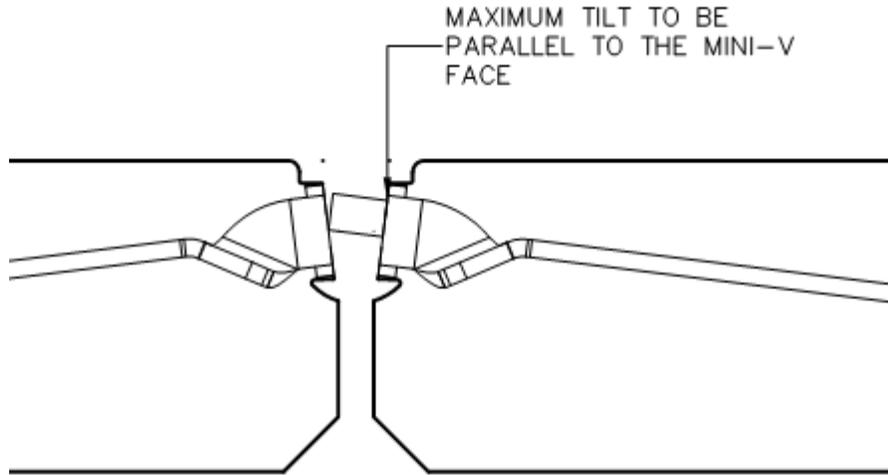
1. Develop, test and approve a welding procedure prior to each project. Each field welder shall be pre-qualified for this welding procedure.
2. Require a pre-job meeting to review welding procedures between the certified welder, the welding inspector, the Engineer of Record, and the precast concrete specialty engineer prior to welding. Invite a JVI representative to this meeting. At this meeting, perform, review, and approve sample welding of the connection. Follow all specifications and all details indicated on the drawings. Any inconsistencies should be brought to the attention of the Engineer of Record. Advise all welders not to oversize the weld. Do not accept any oversize welds.
3. Do not weld within the last 3/8" of the faceplate on either end. Recommended welding zone is shown below. Weld passing through hole is acceptable.



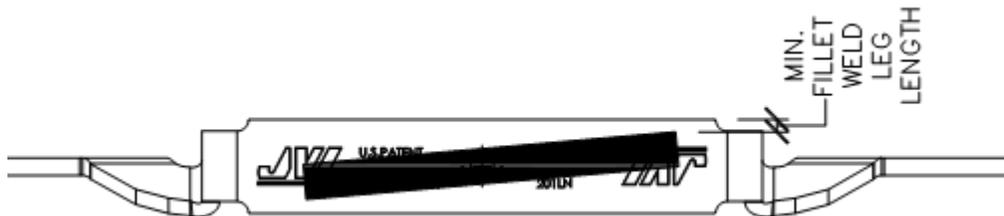
4. All welds for making connections should be designed and installed in accordance with the latest edition of the American Welding Society (AWS) manual.
5. Various erection bar widths will be required to account for the varying joint widths. It is suggested to supply a minimum of 3 widths of bars +/- 3/16" (5mm) from the ideal width. DO NOT weld multiply erection bars together to make the connection. Joints requiring erection material wider than 1" requires special approval from the responsible engineer.
6. The erection bar length should not to be less than the length of the required weld. Misalignment between adjacent Mini-vs can occur. To compensate for this condition, longer erection bars will be required.



- 7. Erection bars are ideally placed parallel to the top edge of the mini-v. Rotation of the erection material is allowed with the maximum rotation allowed shown below.



- 8. Tilt along the face of the mini-v as shown below is acceptable provided the available geometry still meets AWS requirements for fillet weld and flare-bevel weld.



- 9. Place the flat or round erection bars such that their top surfaces are a minimum of the weld size below the mini-v edge.
- 16. Periodically inspect welding and erection bar placement to ensure the Mini-v will perform as designed.
- 17. JVI offers stainless steel in 201LN. The 201LN is an austenitic stainless steel stronger and similar in durability to 304 stainless steel. The welding of 201LN is the same as 304. 201LN can be welded to 304. For more information on 201LN and 304 stainless steel, visit the JVI web site: <http://www.jvi-inc.com>.
- 18. When using "J" Finished Mini-vs, an application of a zinc-rich coating (ZRC) should be required after welding for corrosion protection.
- 19. For stainless steel mini-v, use A3304 stainless steel erection bar and welding electrode E308.
- 20. For J-Finish mini-v use A36 grade erection bars and use welding electrode E70XX
- 21. Do Not Over Weld.

For further information and discussion, please contact the Engineering Department at JVI, 1-800-742-8127.