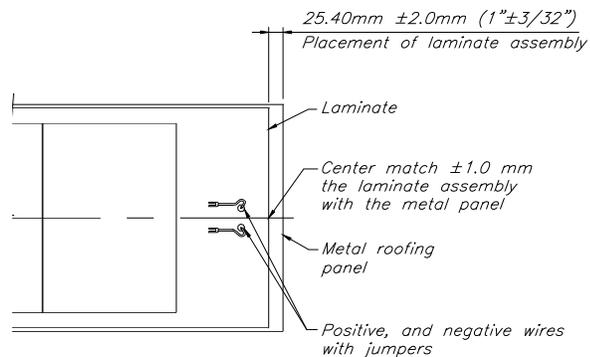


SECTION 2

2.1. Detailed PVL Application Instructions – With Top Mounted J-Box

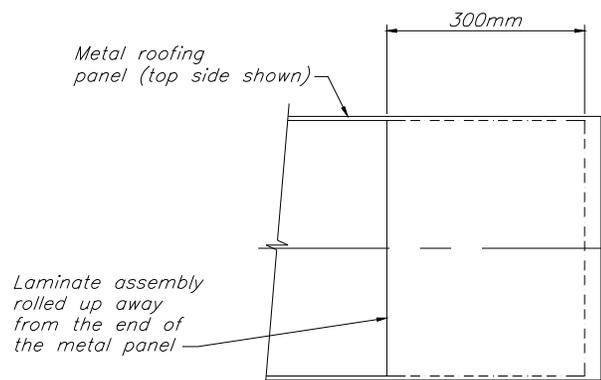
Laminate Installation

1. Remove any protective film from the face of the steel pan. Clean the steel pan with ISOPROPYL ALCOHOL (90% Alcohol - 10% Water) where the double stick and the laminate will be placed. If the pan is very dirty (material has been stored outside), the pan should be washed using a low-pressure water spray (i.e. garden hose) or power washer (ex. 1600 PSI) and a cleaning solution [$\frac{1}{4}$ Cup Trisodium Phosphate, $\frac{1}{2}$ cup liquid detergent (optional) and 5 gallons water: then rinsed before cleaning with alcohol solution.
2. PVL should be bonded while still on the ground on a flat and rigid surface with temperature between 10°C and 38°C (50°F and 100°F). Unroll and align the laminate and double stick assembly in the center of the steel pan. The laminate assembly should be positioned ~25mm (1 inch) from the end of the steel panel (see View #1)



View 1

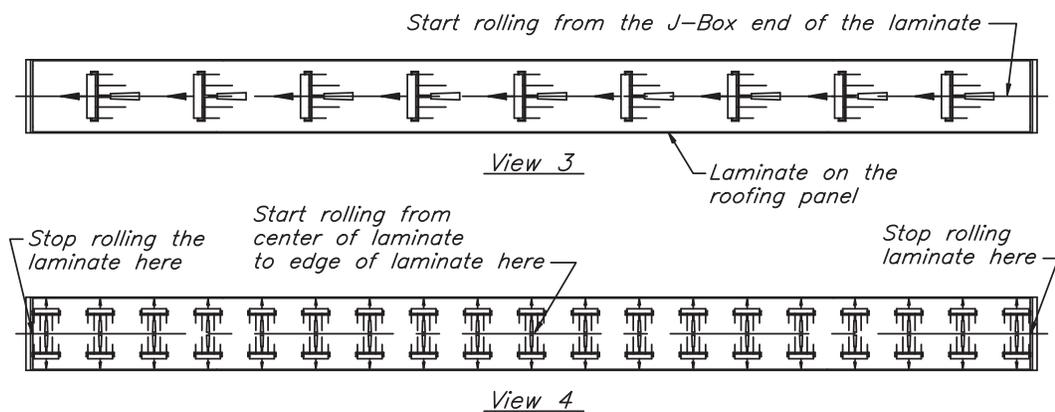
3. Lift up the laminate and double stick assembly about 300 mm (12") off of the steel pan, peel the release paper off of the double stick material approximately 150 mm (6") off the metal and fold it under. Ensure that the laminate is centered on the metal panel, and that the laminate assembly does not move on the metal



View 2

panel during the process (see View 2). This is critical, as **the laminate's position will be fixed after the first six inches is bonded to the steel pan.**

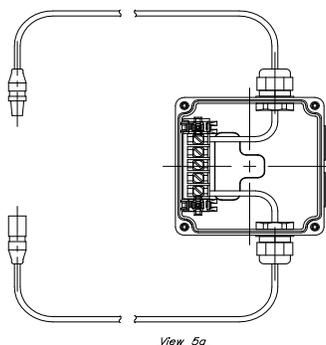
4. Stick the peeled end of the laminate assembly onto the steel pan. Roll up the rest of the laminate assembly up to the stuck portion of the laminate. After the laminate assembly is rolled up on the steel pan, one person should peel the release paper from the bottom of the laminate assembly as another person unrolls the laminate onto the steel pan. Stick the remaining laminate against the pan, making sure the laminate is aligned properly on the steel pan.
5. After the laminate has been applied completely to the steel pan, use a roller to press the center of the laminate against the steel pan (See View 3). Then use a roller to press the laminate onto the steel pan, starting from the center of the laminate, and rolling out to the edges of the laminate (See View 4).



PVL Modules supplied with Factory “Quick Connect” Wires and Terminals

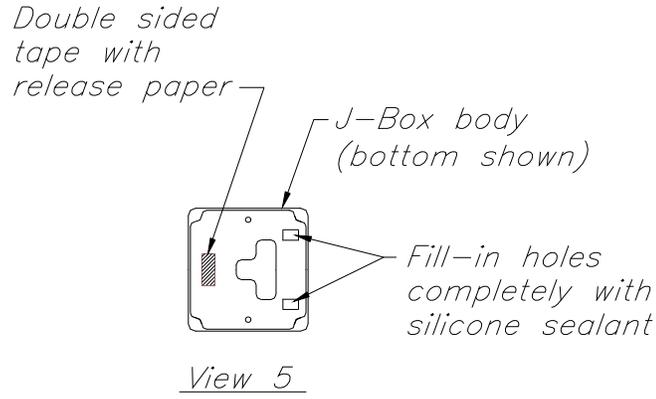
6. The PVL Modules can also be supplied with J-Boxes with factory-installed Quick Connect wires and terminals. The J-Box is bonded to the laminate/steel pan assembly using the Top Mounted J-Box Instructions found in this manual. After the J-Box is mounted to the laminate / steel pan assembly, the modules are wired together using the Quick Connect wires and terminals. (See View 5a). See Addendum #1: wiring *UNI-SOLAR* PVL Modules with Quick Connect Terminals

NOTE: The Quick Connect terminals are meant to be used as interconnection devices only. They are not to be used as a means of disconnecting the solar array.

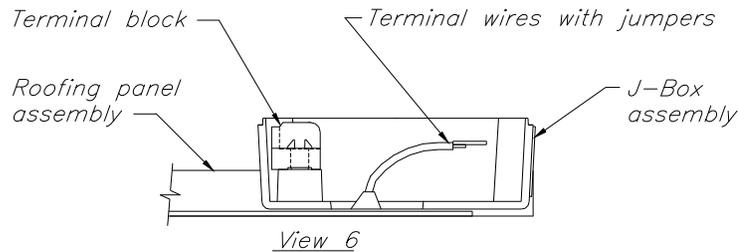


Top Mounted J-Box Installation

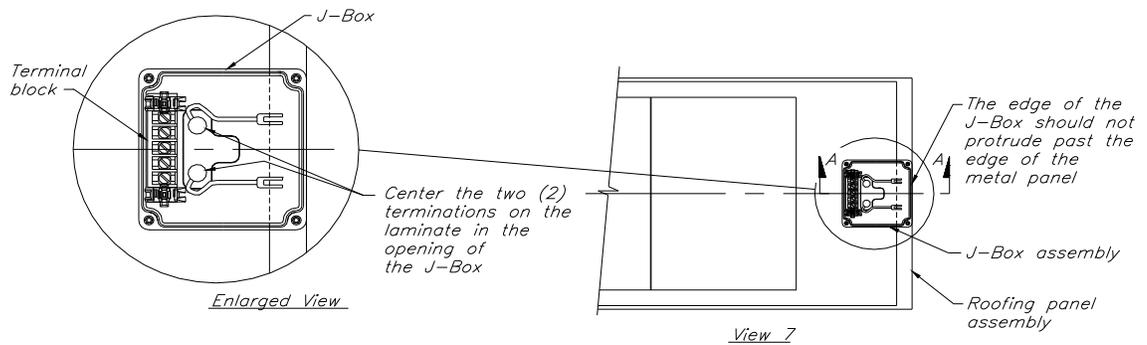
7. Make sure there is a piece of double-sided tape on the bottom of the J-Box (See View 5). If you have ordered the J-Box with Quick Connects, your J-Box will look like View 5a.



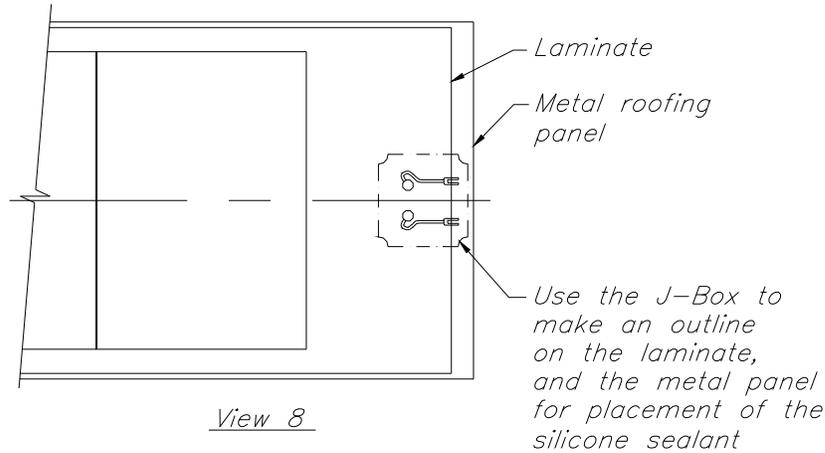
8. Place the J-Box on the laminate with the two (2) wires protruding through the opening on the bottom of the J-Box (see View 6)



9. Center the two (2) termination wires on the laminate in the center of the opening on the bottom of the J-Box (See Enlarged View and View 7).

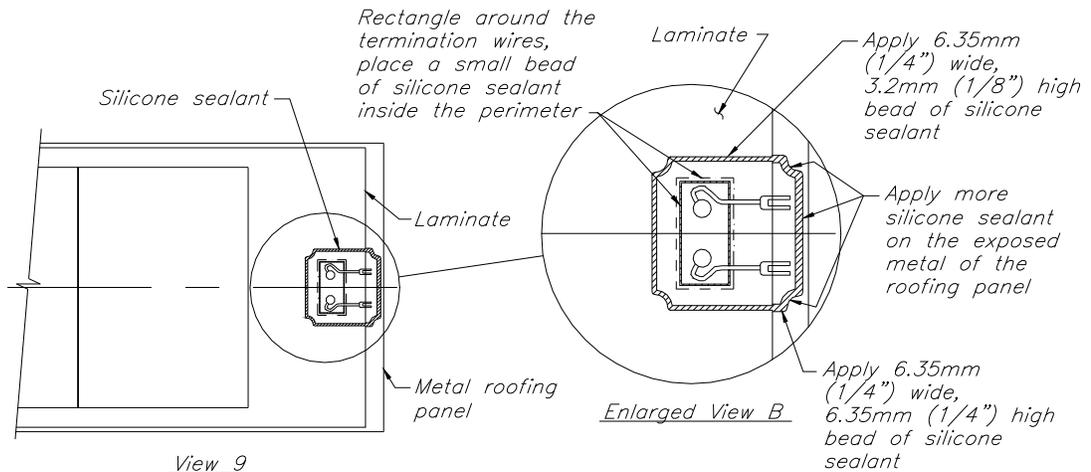


10. Make an outline of the box with a felt tip marker. After you have made the outline of the J-Box, set the J-Box aside (See View 8).



11. Fill in the two openings on the bottom of the J-Box with the supplied Dow 739 RTV silicone sealant (Black, 10.3 oz. USO Part # AA320879) (see View 5)

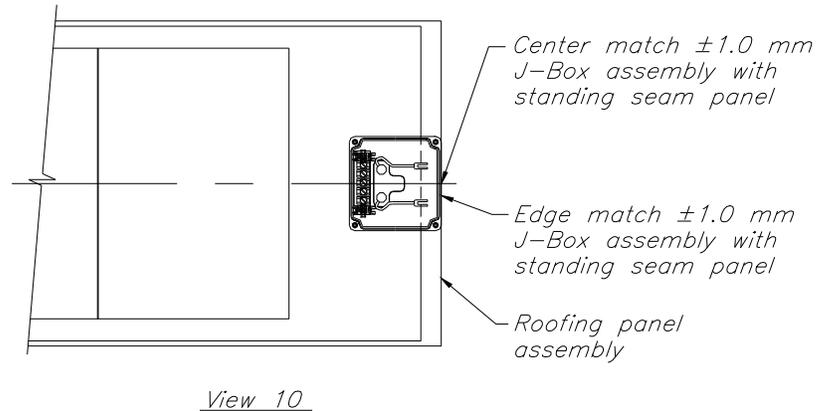
12. Apply the silicone sealant caulking just inside the marked position on the laminate and steel pan as shown in View 9 and the Enlarged View B. Apply a generous bead (1/4" x 1/4") of silicone sealant. Apply a small bead (1/4" x 1/8") of silicone sealant on the inside perimeter of the rectangular marking around the two (2) terminal wires (See Enlarged View B).



13. Make sure the sealant bead is continuous and uniform.

14. Remove the release paper from the double-sided tape on the bottom of the J-Box.

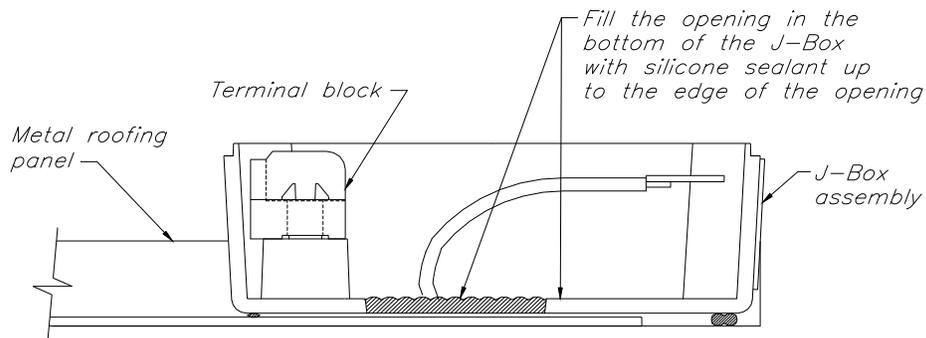
15. Align the J-Box case on the silicone sealant on the laminate and steel pan. Make sure the edges of the bottom of the J-Box are aligned properly with the silicone sealant on the steel pan.
16. Make sure that the two terminal wires are properly aligned with the opening on the bottom of the J-Box. The J-Box should be center matched, and edge matched with the steel pan (See View 10).

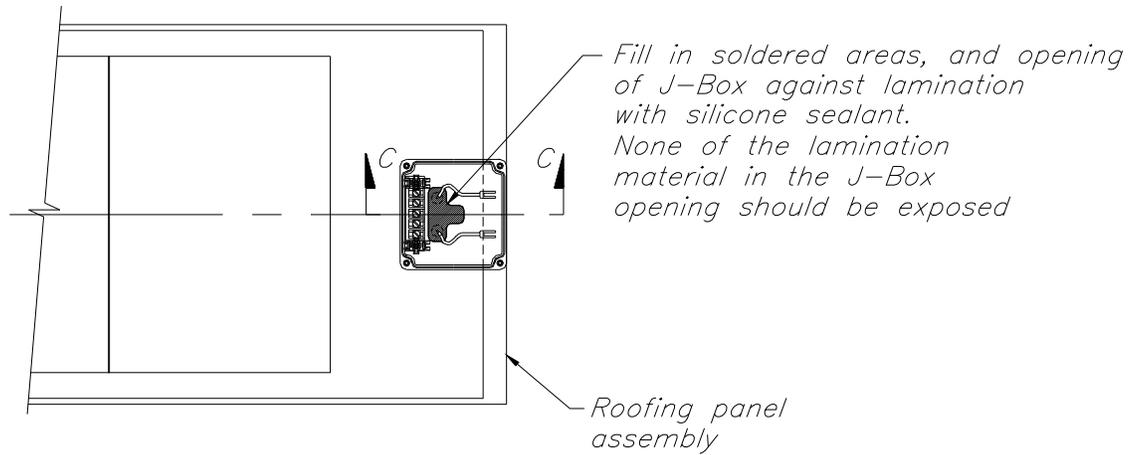


17. Check to make sure that the two terminal wires are not trapped or pinched between the J-Box case and the laminate.
18. Press the J-Box against the steel pan so that the double-sided tape on the bottom of the J-Box sticks to the PV laminate (the double-sided tape will hold the J-Box in place until the silicone sealant has fully cured).

NOTE: If you are required to use screws with the laminate (ex. high slope roofs in very hot climates), installers can use the screw penetration template included with their PVL shipment. A picture of the template is shown on page 7 of this manual.

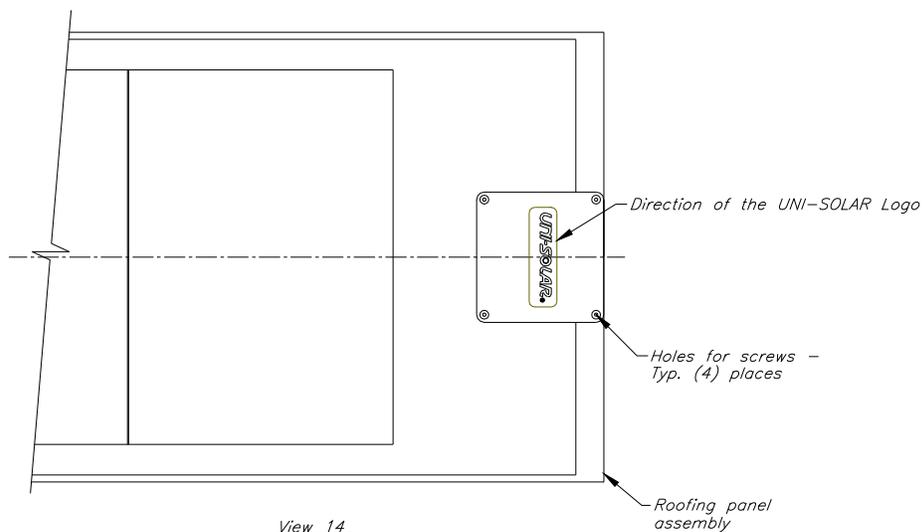
19. Fill in the opening in the bottom of the J-Box completely with the silicone sealant up to the inside edge of the opening. None of the laminate should be exposed in the J-Box opening. Do not over-fill the opening with sealant (see View 12 and 13). The sealant should come up and over the edge slightly.





View 13

20. Place the J-Box lid on the top of the J-Box after allowing the silicone sealant to set up (“cure”). This will take approximately 8 hours.
21. Make sure the direction of the UNI-SOLAR logo on the J-Box lid is properly placed with respect to the steel pan (See View 14).
22. Screw down the four screws at the four corners of the J-Box lid. The recommended torque range for the J-Box cover screws is 14 ± 1 in-lb.



View 14

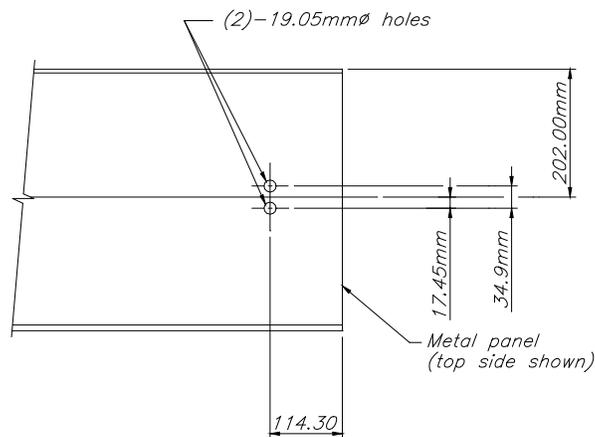
23. Screws for laminate penetration shall either be wood stainless steel screw #8 or wood screw #10; the torque shall be in the range of 20 to 60 in-lb

2.2 Detailed PVL Application Instructions – With Bottom Mounted Junction Box

NOTE: This option shall not be used on BIPV applications on buildings, but may be used for ground mount, or other open structures applications only, per NEC section 690.31.

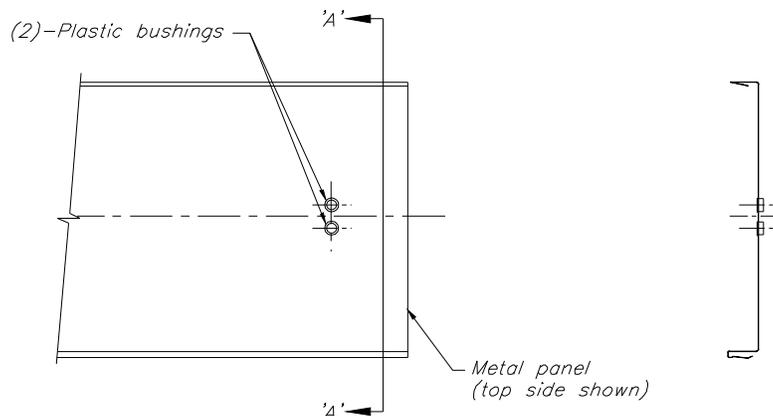
Laminate Installation

1. Cut two (2) $\frac{3}{4}$ " (19 mm) holes in the metal panel for the terminations. The holes must be cut into the metal panel from the same side that the laminate assembly will be placed upon so that any burr is on the bottom side. The proper positioning of these holes is critical. There is just 1 mm of tolerance for the positioning of these holes, see View 15.



View 15

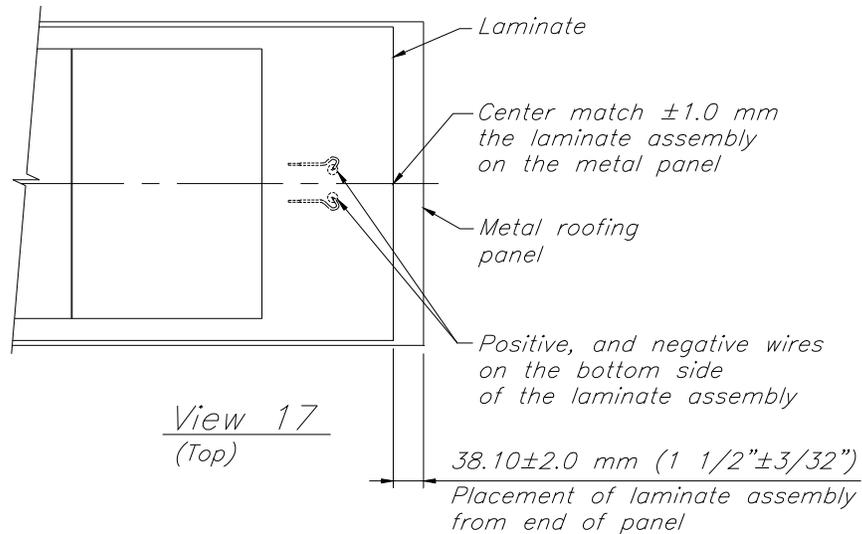
2. Remove any protective film from the face of the metal pan. Clean the metal pan with ISOPROPYL ALCOHOL (90% Alcohol - 10% Water) where the double stick and the laminate will be placed. If the pan is very dirty (material has been stored outside), the pan should be power washed with a cleaning solution (1/4 Cup Trisodium Phosphate, 1/2 Cup Detergent (ex. Tide®), and 5 gallons Water) and then rinsed before cleaning with alcohol solution



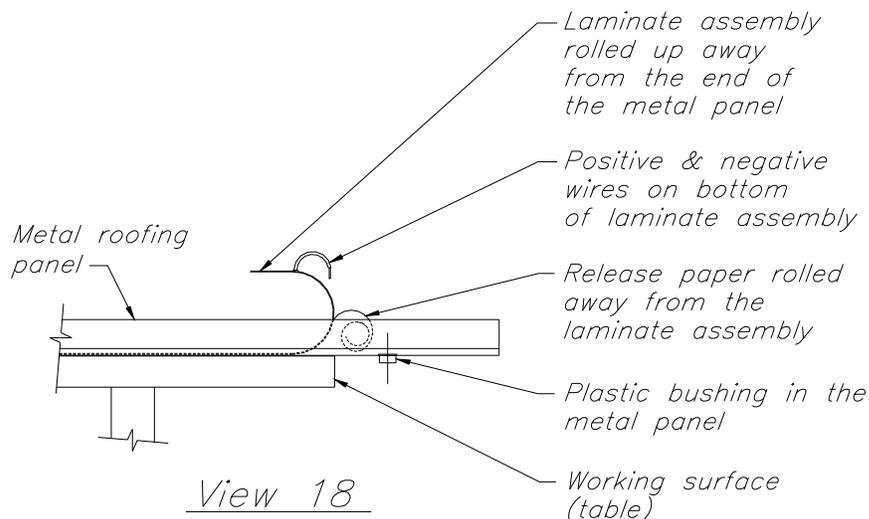
View 16

End View

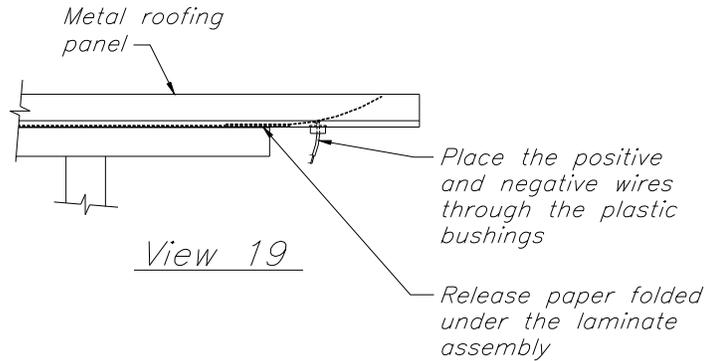
3. Insert (2) two plastic bushings into the cut holes, one in each hole from the topside of the metal pan, see View 16 above.
4. The work surface should be flat and rigid. Make sure the end of the metal panel overhangs the flat rigid working surface just past the plastic bushing in the bottom of the metal panel.
5. Align the laminate and double stick assembly on the center of the metal roofing pan. The laminate assembly should be positioned approximately 1½ inches (38 mm) from the end of the metal panel, see View 17 below.



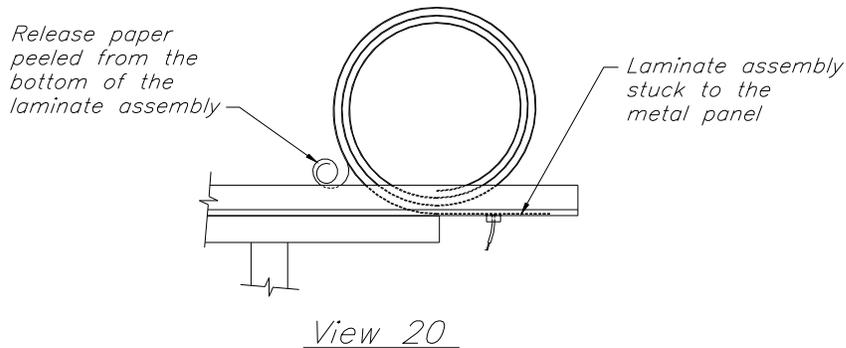
6. Then lift up the laminate and double stick assembly off the metal pan just past the edge of the wires (about 2" inches (51 mm) past the (2) two wires). Peel the release paper off of the double stick material approximately 6" inches (150 mm) and fold it under. Make sure the laminate is centered on the metal pan and the laminate assembly does not move on the metal pan during this process, See View 18. This is critical as **the laminate's position will be fixed after this first six inches is bonded to the metal pan.**



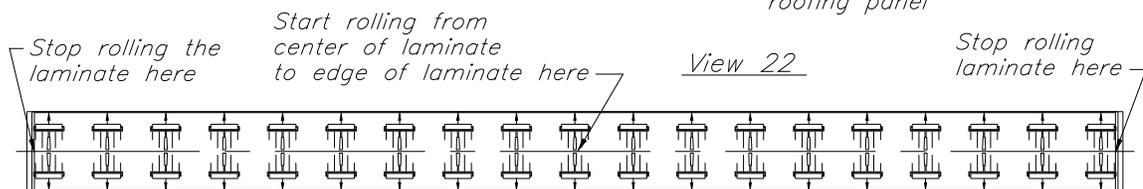
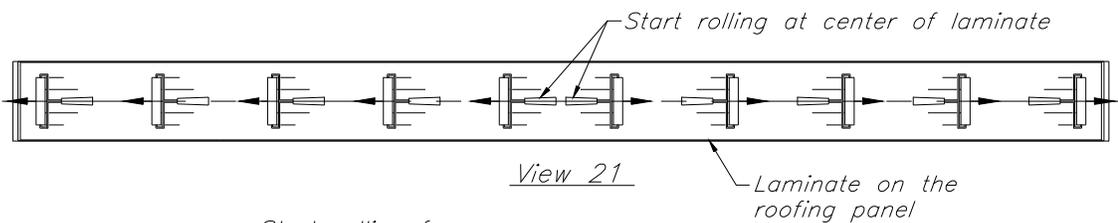
- Carefully roll the laminate assembly back onto the metal pan while placing the two (2) wires through the plastic bushings in the metal pan, see View 19. Stick the peeled end of the laminate assembly onto the metal panel.



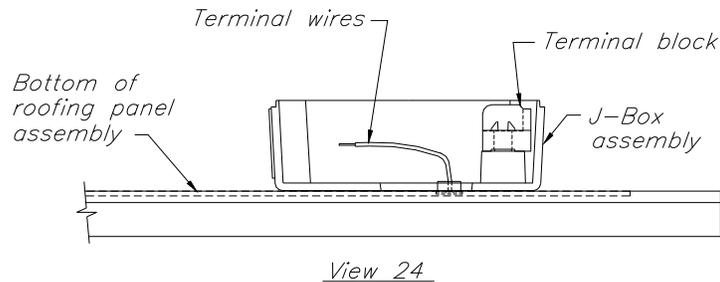
- Roll up the rest of the laminate assembly up to the stuck portion of the laminate. After the laminate assembly is rolled up on the metal pan, one person should peel the release paper from the bottom of the laminate assembly as another person unrolls the laminate onto the metal pan. Stick the laminate assembly against the metal pan, see View 20



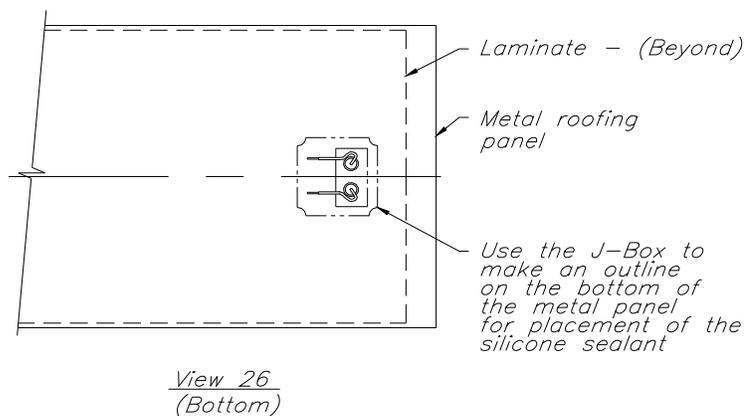
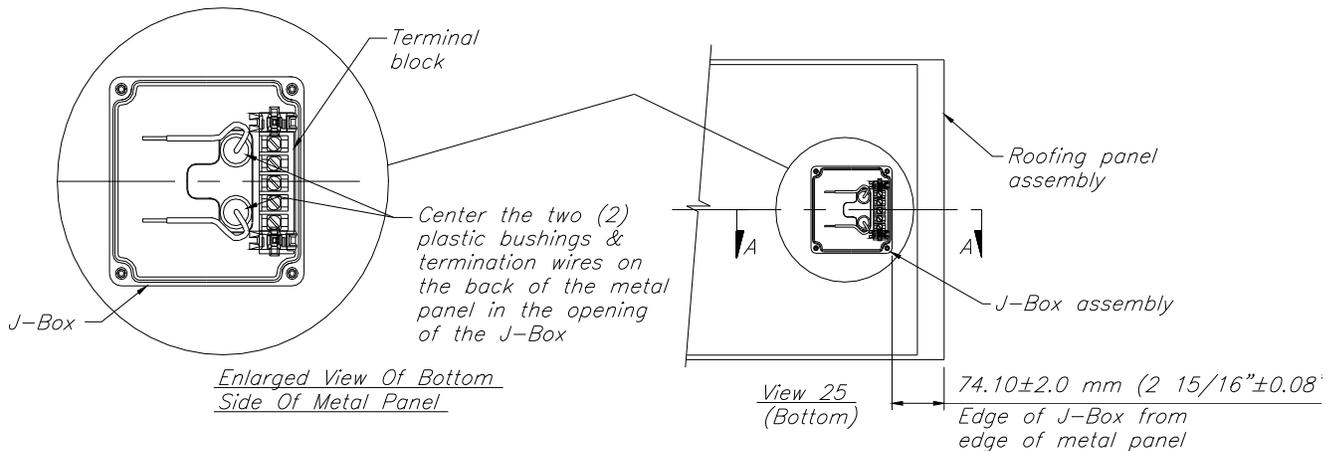
- After the laminate has been applied completely onto the metal pan, use a roller to press the center of the laminate against the metal pan. Then use the roller to press the laminate assembly onto the metal pan, starting from the center of the laminate and rolling out to the edges of the laminate, see View 21 and 22.



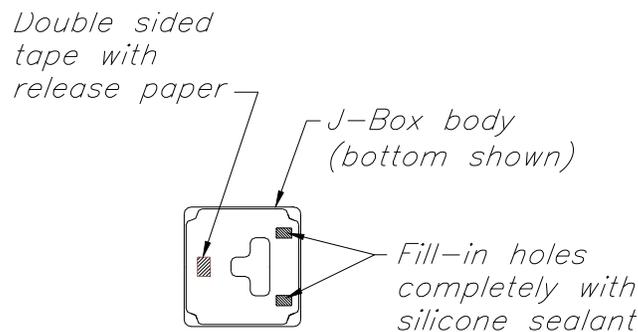
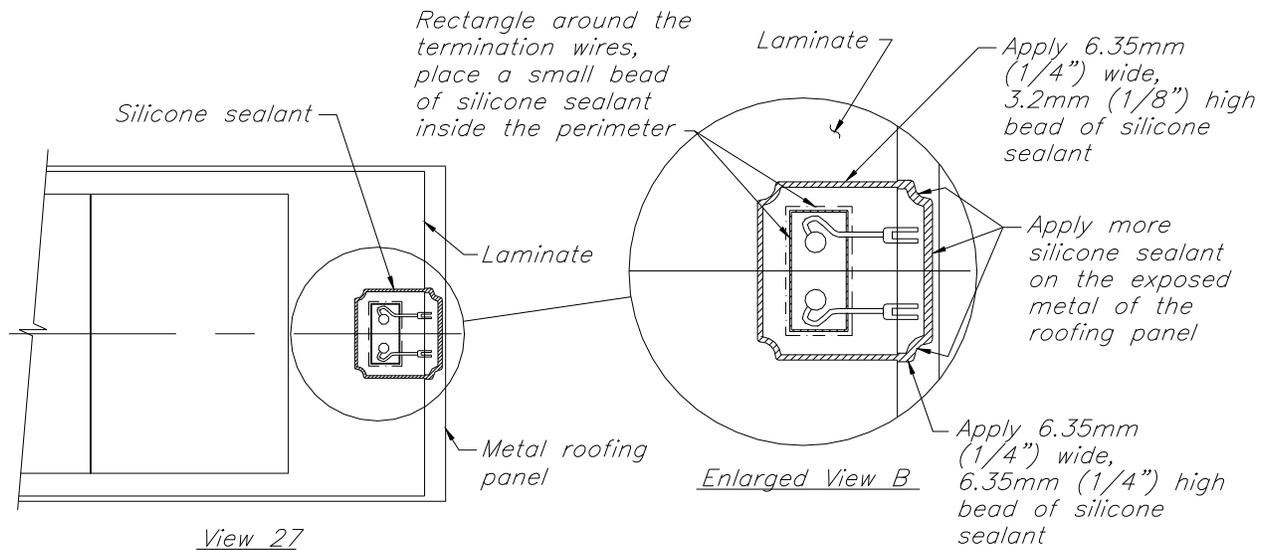
10. To prepare to place the J-Box on the metal panel assembly, turn over the metal pan so that the bottom side faces up.
11. Place the J-Box on the bottom of the metal pan with the two (2) wires and plastic bushings placed through the opening on the bottom of the J-Box, see View 24.



Center the two (2) plastic bushings and termination wires on the bottom of the metal pan in the center of the opening on the bottom of the J-Box, see View 25 and the Enlarged View, and make an outline of the J-Box on the metal pan, see View 26.

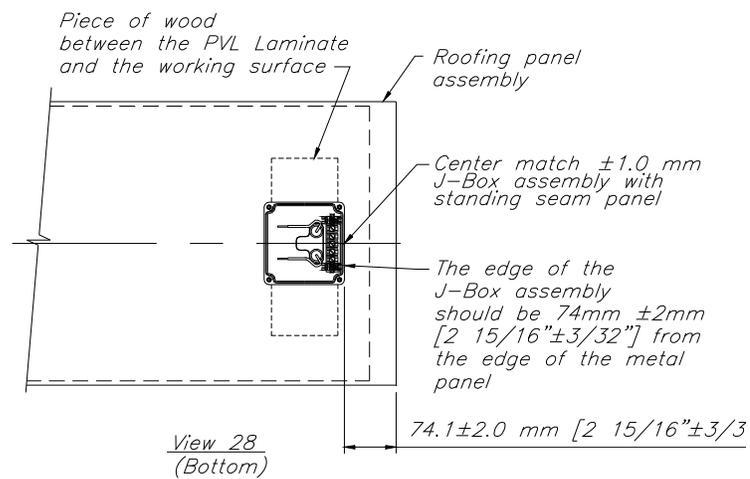


12. After you have made the outline of the J-Box on the bottom of the metal pan, set the J-Box aside.
13. Apply the silicone sealant caulking just inside the marked position on the laminate and metal pan as shown in View 27 and the Enlarged View B. Apply a generous bead ($\frac{1}{4}$ " x $\frac{1}{4}$ ") of silicone sealant. Apply a small bead ($\frac{1}{4}$ " x $\frac{1}{8}$ ") of silicone sealant on the inside perimeter of the rectangular marking around the two (2) terminal wires (See Enlarged View B).
14. Make sure that the sealant bead is continuous and uniform.
15. Make sure there is a piece of double sided tape on the bottom of the J-Box. Fill in the two openings on the bottom of the J-Box with silicone sealant, see View 27 below. Remove the release paper from the double sided tape on the bottom of the J-Box.

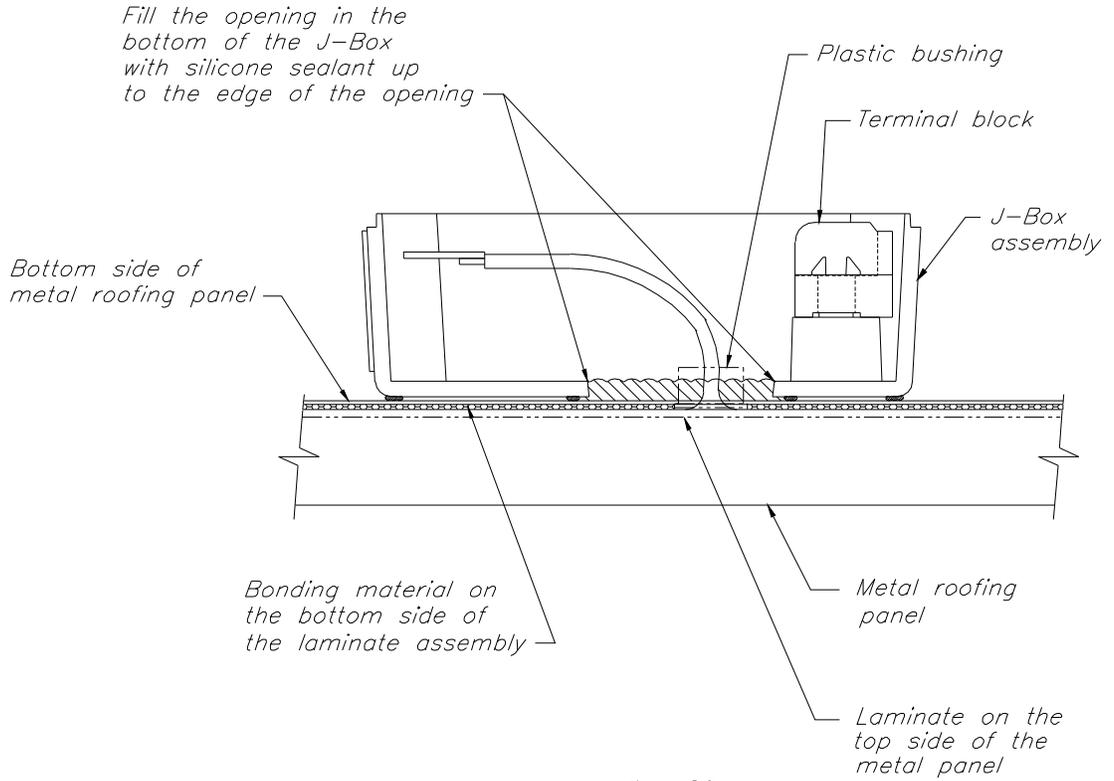


16. Place a wood block 2 x 4 x 10" inches long beneath the metal panel (between the PVL laminate and the working surface) in the area below the outline of the silicone sealant to help support the pan when applying the J-Box assembly, see View 28.

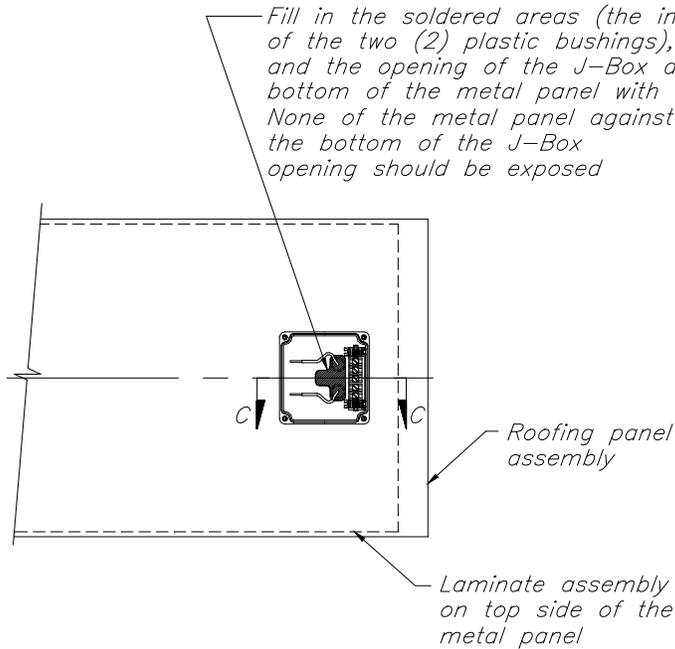
- Align the J-Box case on the silicone sealant on the metal pan. Make sure the edges of the bottom of the J-Box are aligned properly with the silicone sealant on the metal pan.



- Make sure that the two terminal wires are properly aligned within the opening on the bottom of the J-Box. The J-Box should be center matched and $2 \frac{15}{16}$ ths (74 mm) from the edge of the metal panel.
- Check to make sure the terminal wires are not trapped or pinched between the J-Box case and the bottom of the metal pan.
- Press the J-Box against the bottom of the metal pan so that the double-sided tape on the bottom side of the J-Box sticks to the metal pan.
- Completely fill the opening in the bottom of the J-Box, including the inside and outside of the two (2) plastic bushings with silicone sealant, up to the inside edge of the opening. None of the metal pan should be exposed in the J-Box opening. Do not overfill the opening with sealant, see View 29 and 30. **NOTE: You must allow the silicone sealant to set up ("cure") for at least eight (8) hours before attaching the J-Box cover.**



View 29



View 30
(Bottom)

22. Place a J-Box lid on the top of the J-Box body.
23. Make sure that the direction of the UNI-SOLAR logo on the J-Box lid is properly placed with respect to the roofing pan.
24. Screw down the four screws of the four corners of the J-Box lid. The recommended torque range for the J-Box cover screws is 14 +/- 1 in-lb.