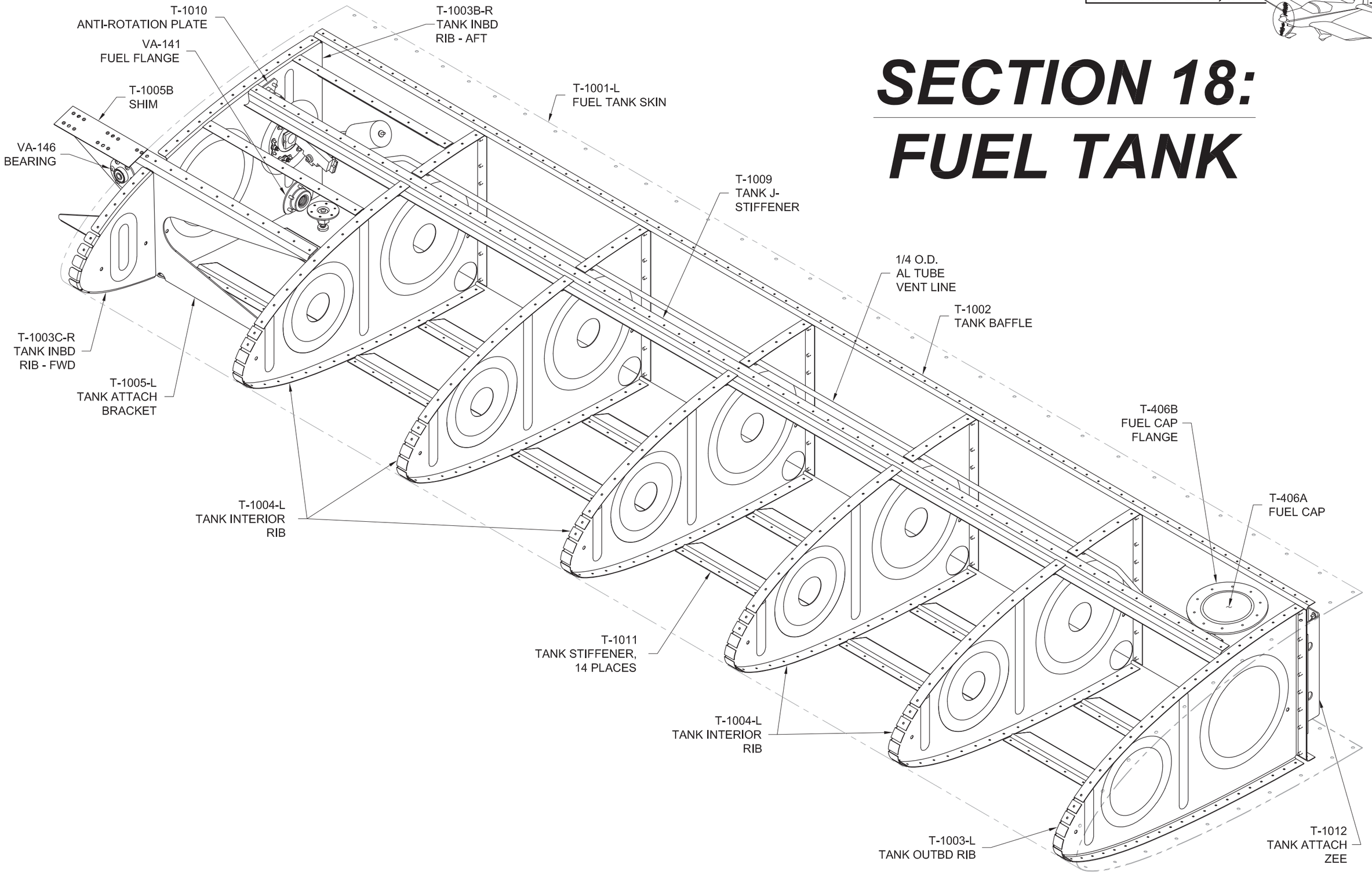
SECTION 18: FUEL TANK



Step 1: Flute and straighten all fuel tank ribs per Section 5-12.

Step 2: Trim T-1011 Tank Stiffeners as shown in Figure 1. (Figure 1 shows the untrimmed stiffeners "flat" or "un-bent" for clarity.)

One T-1008 Vent Line Clip is trimmed from the end of each "stick" of stiffeners. Only one vent line clip is required for each tank and extras may be discarded.

Set half the tank stiffeners aside for assembly into the right fuel tank.

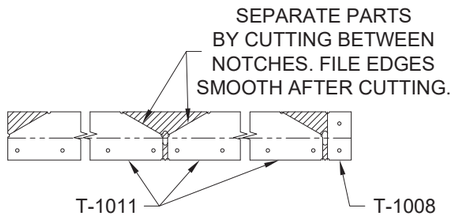


FIGURE 1: TANK STIFFENER TRIM DIAGRAM

Step 3: Trim T-1012 Tank Attach Zee's as shown in Figure 2. (Figure 2 shows the untrimmed zee's "flat" or "un-bent" for clarity.)

Note that the inboard tank attach zee has no holes for nutplate attchment.

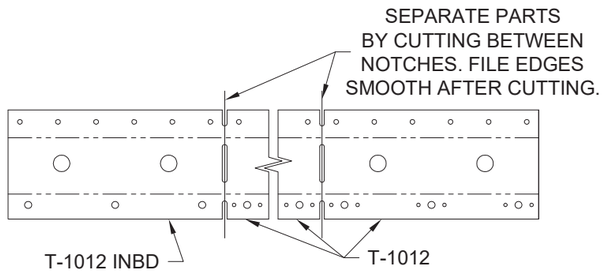


FIGURE 2: TANK ATTACH ZEE TRIM DIAGRAM

Step 4: Fabricate two T-1009 Tank J-Stiffeners by cutting two pieces of J-Channel each one 64 1/4 inches long. Draw a centerline on each tank J-stiffener as shown in Figure 3. Set one tank J-stiffener aside for assembly into the right fuel tank.

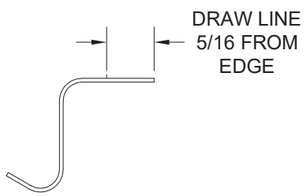


FIGURE 3: TANK J-STIFFENER END VIEW

Step 5: Place the T-1001-L Tank Skin in the Leading Edge Assembly cradle. Remove the vinyl film from the inside surface of the tank skin and deburr edges. Cleco all the T-1011 Tank Stiffeners and the VA-112 Drain Flange to the tank skin as shown in Figure 4.

Final-Drill all the tank stiffeners and the drain flange to the tank skin. The most inboard rivet hole in the two tank stiffeners in the bottom of the inboard rib bay do not correspond to the most inboard hole in the tank skin. Match-Drill from the skin into the stiffeners, then remove the stiffeners and trim the inboard ends of the stiffeners leaving 1/4 inch from the center of the "new" hole to the end of the stiffener.

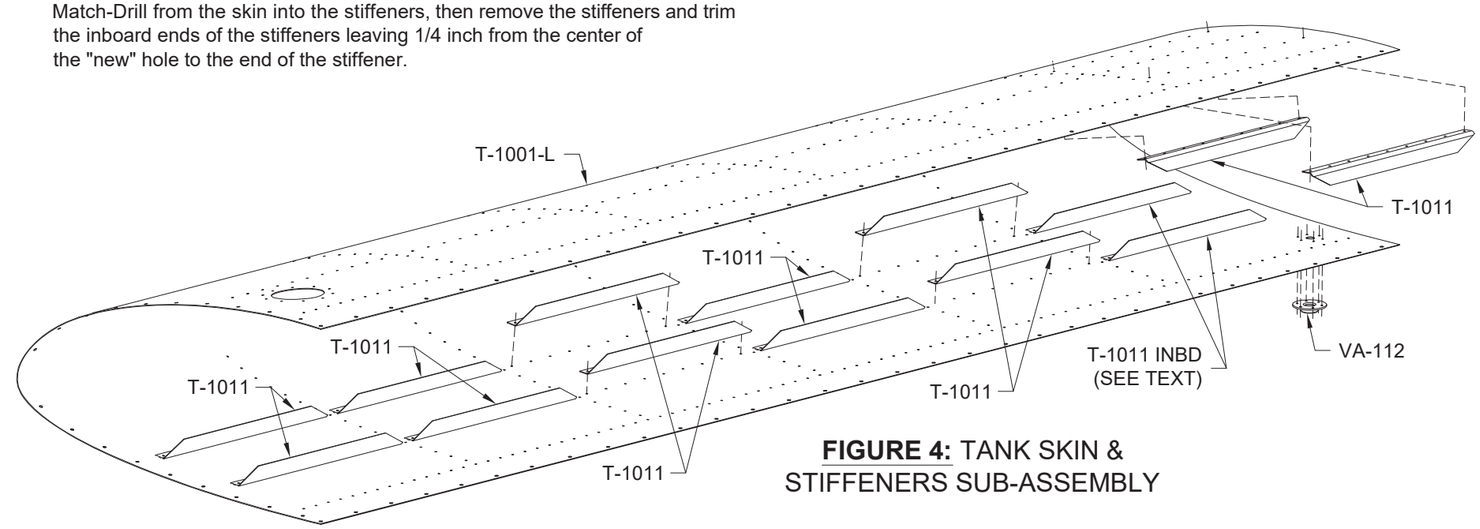


FIGURE 4: TANK SKIN & STIFFENERS SUB-ASSEMBLY

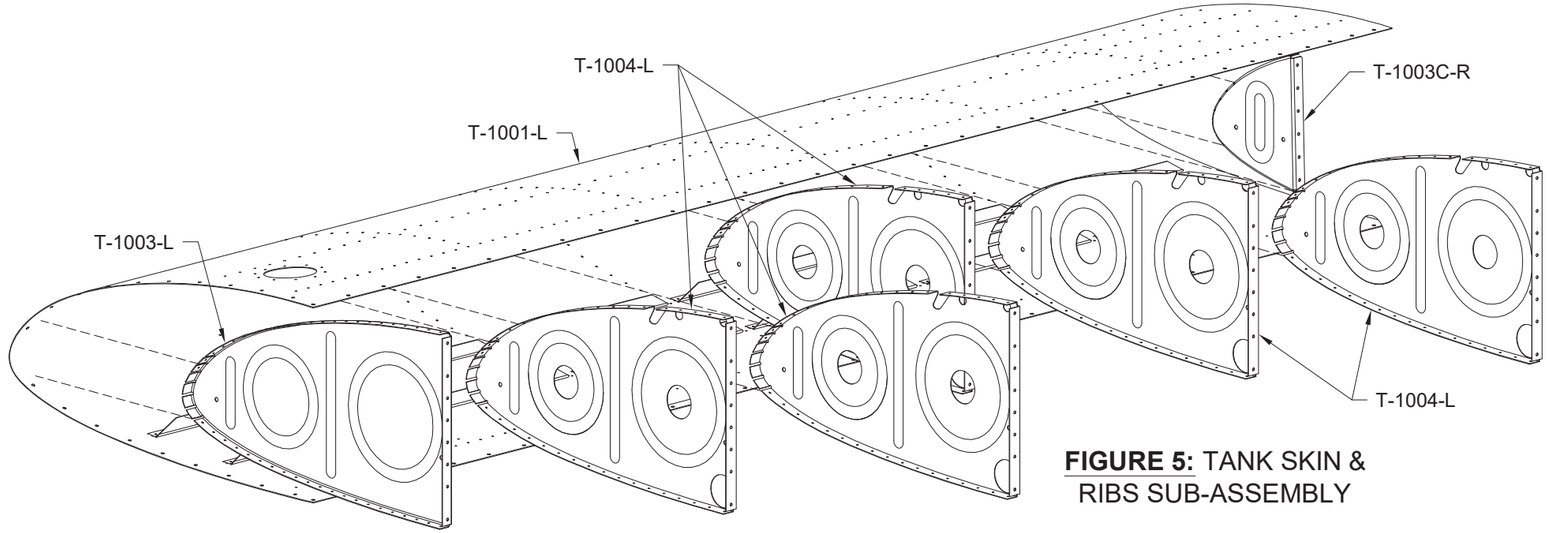


FIGURE 5: TANK SKIN & RIBS SUB-ASSEMBLY

Step 6: Cleco the T-1003-L Tank Outboard End Rib, T-1003C-R Tank Inboard Rib - Fwd, and T-1004-L Tank Interior Ribs to the T-1001-L Tank Skin as shown in Figure 5.

Final-Drill all the ribs to the skin.

Step 1: Fit the T-1009 Tank J-Stiffener to the T-1001-L Tank Skin as shown in Figure 2.

Position the J-stiffener such that there is 1/4 inch from the first hole center to the end of the J-stiffener. Align the centerline drawn on the flange of the J-stiffener with the holes in the tank skin, then match-drill and cleco the J-stiffener to the tank skin.

Step 2: Cleco the T-1005-L Tank Attach Bracket to the T-1001-L Tank Skin and T-1003C-R Tank Inboard Nose Rib as shown in Figure 2.

Final-Drill all tank attach bracket rivet holes to final size.

Step 3: The T-406B Fuel Cap Flange is provided with a slight bend in the fwd/aft direction. In preparation for fitting the fuel cap flange to the tank skin, adjust the amount of bend in the flange so that it conforms to the curve of the tank skin. See Figure 1 for the approximate shape.

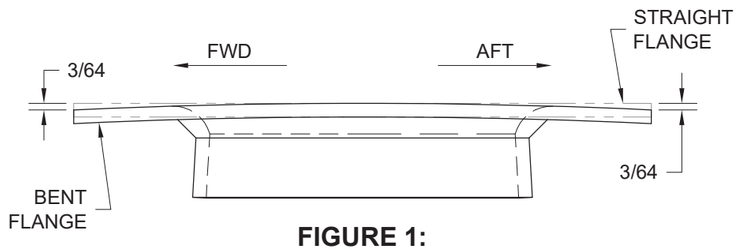


FIGURE 1:
FUEL CAP FLANGE
EDGE VIEW
(FULL SCALE)

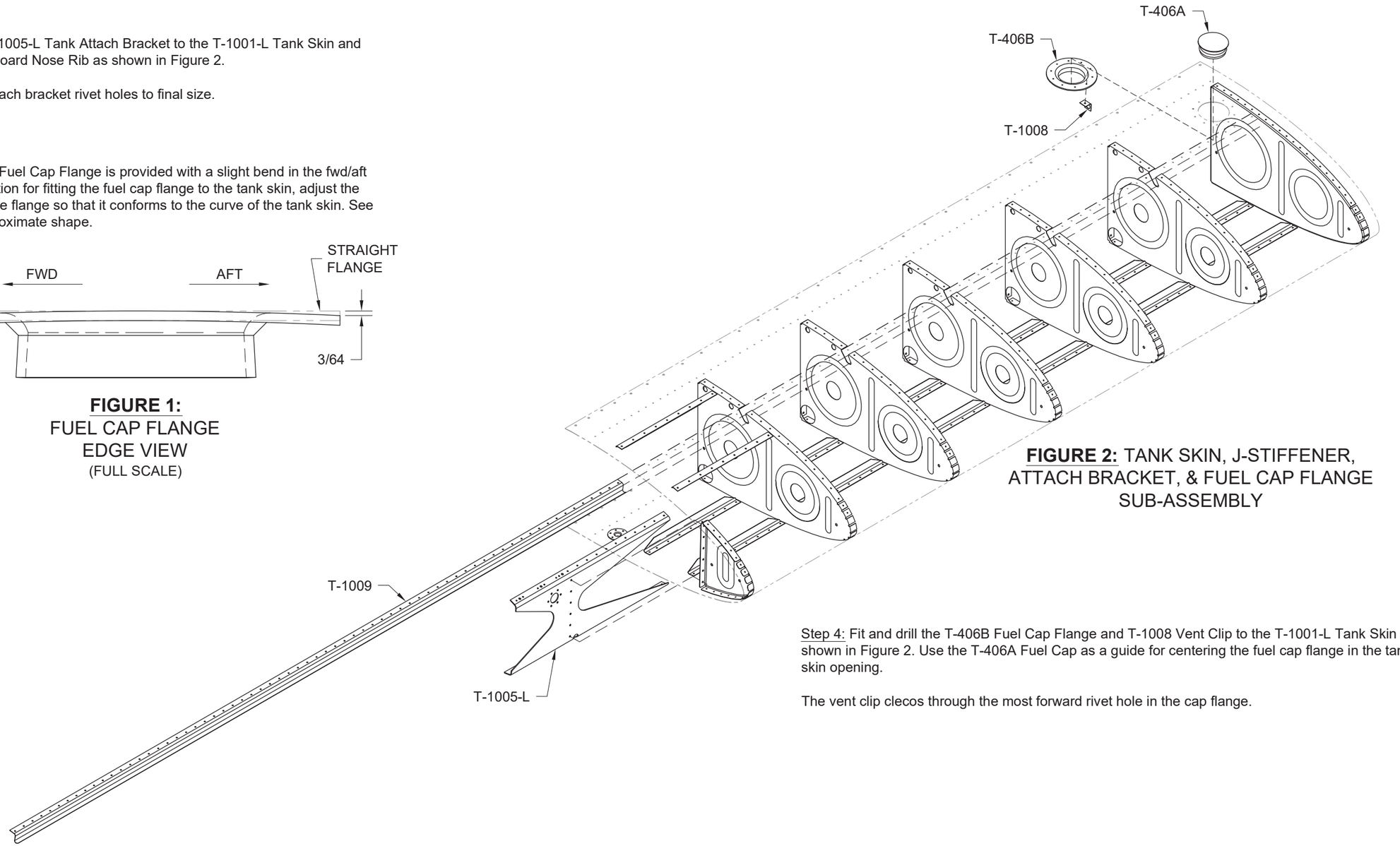


FIGURE 2: TANK SKIN, J-STIFFENER, ATTACH BRACKET, & FUEL CAP FLANGE SUB-ASSEMBLY

Step 4: Fit and drill the T-406B Fuel Cap Flange and T-1008 Vent Clip to the T-1001-L Tank Skin as shown in Figure 2. Use the T-406A Fuel Cap as a guide for centering the fuel cap flange in the tank skin opening.

The vent clip clecos through the most forward rivet hole in the cap flange.

Step 1: Cleco nutplates to the T-1012 Tank Attach Zee's as shown in Figure 1. Note that the most inboard tank attach zee does not have nutplates. Final-Drill the nutplate attach rivet holes to #40. Remove the nutplates, countersink the tank attach zee's for the nutplate attach rivets, and deburr holes. Prime all attach zee's if/as desired. Rivet the nutplates to the attach zee's. Read Section 5R for more information on installing nutplates.

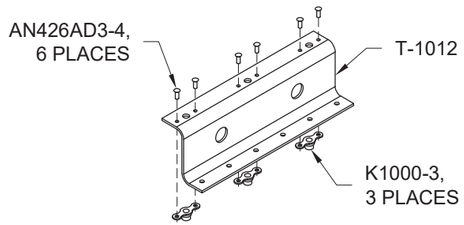


FIGURE 1: T-1012 NUTPLATE ATTACH

Step 2: Cleco the T-1003B-R Tank Inbd Rib-Aft to the T-1001-L Tank Skin and T-1005-L Attach Bracket as shown in Figure 2.

Final-Drill the aft tank inboard rib to the tank skin and attach bracket.

Step 3: Cleco the T-1002 Tank Baffle and T-1012 Tank Attach Zee's to the tank rib aft flanges as shown in Figure 2.

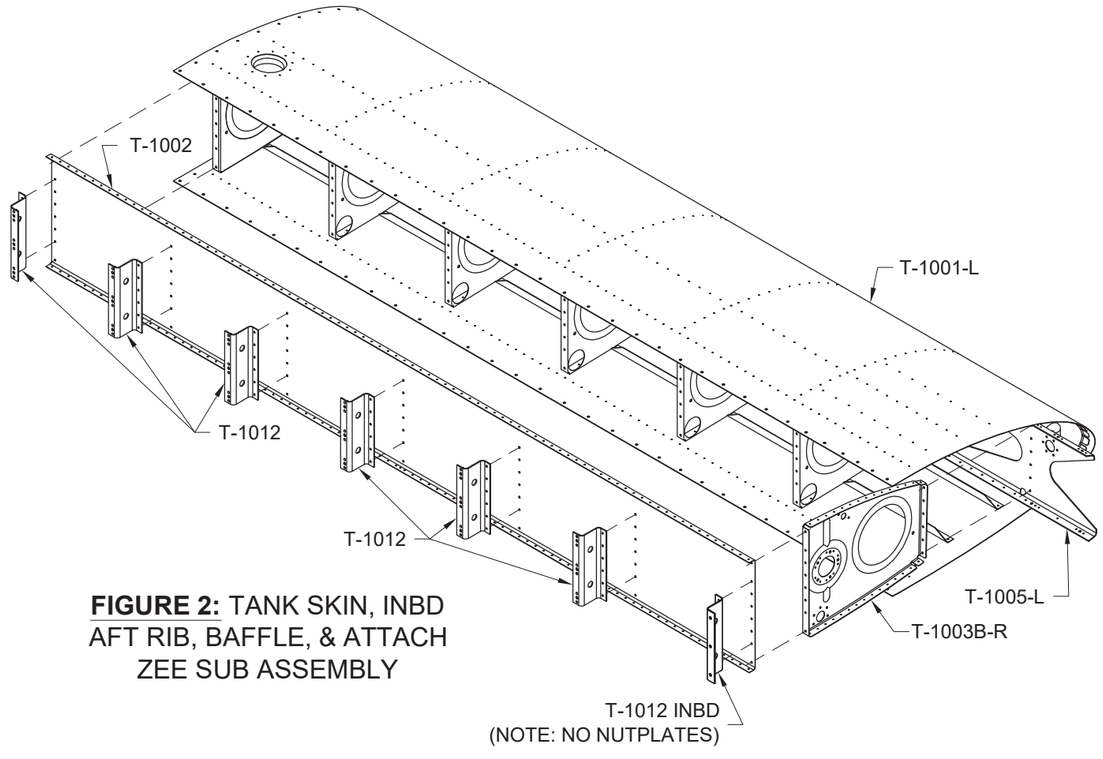


FIGURE 2: TANK SKIN, INBD AFT RIB, BAFFLE, & ATTACH ZEE SUB ASSEMBLY

Step 3 (continued): Note that the tank attach zee's are not all installed in the same orientation. Note also that the most inboard attach zee has no nutplates installed on it.

Final-Drill all attach zee to tank baffle to rib flange holes and all tank baffle to rib flange holes to #30.

Step 4: Cleco the T-1001-L Tank Skin to the upper and lower flanges of the T-1002 Tank Baffle.

Final-Drill all tank skin to tank baffle flange holes to #40.

Step 5: Final-Drill all the screw holes in the T-1001-L Fuel Tank Skin to #19.

Step 6: Machine countersink the row of holes that attach the T-1001-L Fuel Tank Skin to the T-1002 Tank Baffle. Read Section 5E for more information on countersinking and dimpling. The baffle must be in place during this step to provide a good pilot for the countersink. IMPORTANT: To assure proper part alignment on reassembly, leave every 10th hole un-countersunk. Go back and countersink these holes and install rivets after the tank has been assembled and the sealant has cured.

Step 7: Permanently label the position of each T-1012 Tank Attach Zee so that they will be in the same location for final assembly as they were for prior assembly steps. Remove the attach zees and baffle.

NOTE: If you plan to use the capacative fuel gauge senders offered in the VAN'S AIRCRAFT ACCESSORIES CATALOG you should complete their installation at this point using the instructions supplied in the sender kit.

Step 8: Disassemble the tank.

Machine countersink the top of the T-406B Fuel Cap Flange to accept the dimples in the tank skin.

Deburr all holes in all parts. Dimple all holes as required. Do not dimple the two screw holes in the inboard edge of the T-1001-L Tank Skin as shown on Page 18-5, Figure 3. Dimple the screw holes in the tank skin using the C-frame tool and a hammer rather than forming them with a rivet squeezer. This will result in "crisper", better looking skin dimples.

At this point, all parts of the fuel tank should be deburred, countersunk and/or dimpled.

Step 9: Prime parts if/as desired except do not prime any area that will be in the inside of the tank.

Step 1: The T-1005B and T-1005C Shims are provided as a single piece of metal with the parts "tabbed together". Separate the shims from each other, file-off the tabs, and deburr edges.

Step 2: Final-Drill holes in T-1005B and T-1005C Shims. Use a #40 bit for the small holes; use a #19 bit for the large holes. Deburr all holes.

Step 3: Study Figure 1 until there is no question as to the position and/or orientation of each part or hardware item.

Step 4: Dimple the two #19 holes in the T-1005C Shim which will have K1100-08 Nutplates attached. Dimple the K1100-08 Nutplates and the corresponding nutplate attach rivet holes in the shim. Rivet the K1100-08 Nutplates to the shim as shown in Figure 1.

Step 5: Attach the VA-146 Bearing, K1000-08 and MS21051-L08 Nutplates, and T-1005B & C Shims to the T-1005-L Tank Attach Bracket as shown in Figure 1.

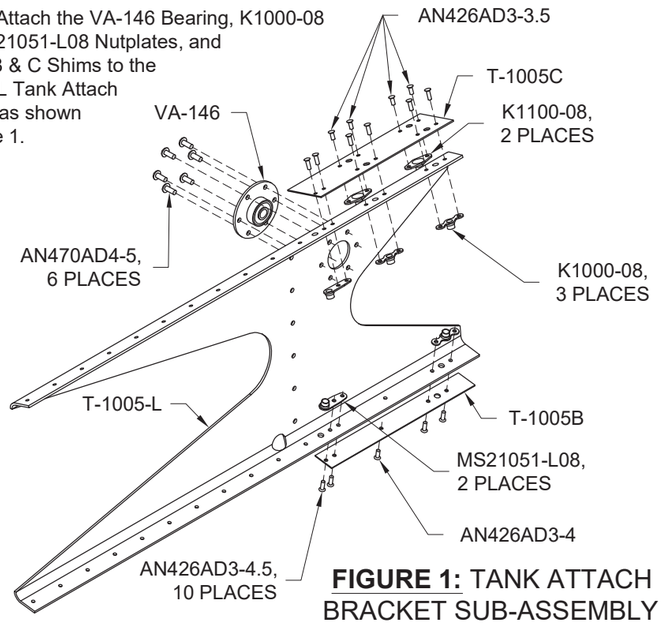


FIGURE 1: TANK ATTACH BRACKET SUB-ASSEMBLY

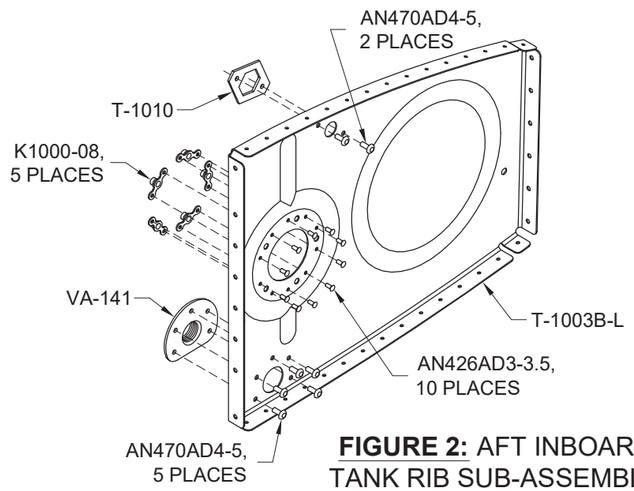


FIGURE 2: AFT INBOARD TANK RIB SUB-ASSEMBLY

NOTE: Assembly steps from this point on require that sealant be installed between mating parts.

Read Section 5S for more information on fuel tank sealant.

The tank is riveted together just like any other structure with one very important difference: Apply sealant between the parts comprising a seam through which fuel could conceivably leak. This includes every rivet.

Step 6: Fabricate and install small plates made from scrap .025 or .032 aluminum to close-off the 3/16 diameter holes in the webs of the T-1003-L Tank Outbd Rib, T-1003B-R Tank Inbd Rib - Aft, and T-1003C-R Tank Inbd Rib - Fwd. These holes are used to hold the ribs and formblocks in proper alignment during hydropress forming of the ribs

Step 7: Attach the VA-141 Fuel Flange, T-1010 Anti-Rotation Plate, and nutplates to the T-1003B-L Tank Inbd Rib - Aft as shown in Figure 2.

Step 8: Rivet the T-1011 Stiffeners and VA-112 Drain Flange to the T-1001-L Tank Skin as shown on Page 18-2, Figure 4. See Figure 3 for rivet call-out.

Recall that the two stiffeners on the bottom of the most inboard rib bay have been shortened to allow water accumulation to migrate aft to the drain point.

Step 9: Rivet the T-406B Fuel Cap Flange and T-1008 Vent Clip to the T-1001-L Tank Skin as shown on Page 18-3, Figure 2. See Figure 3 for rivet call-outs.

Step 10: Rivet the T-1003C-R Tank Inbd Rib - Fwd, T-1004-L Tank Interior Ribs, and T-1003-L Tank Outboard Rib, to the T-1001-L Tank Skin as shown on Page 18-2, Figure 5. See Figure 3 for rivet call-outs.

Begin with the tank inbd rib - fwd and progress from inboard to outboard, finishing with the tank outboard rib.

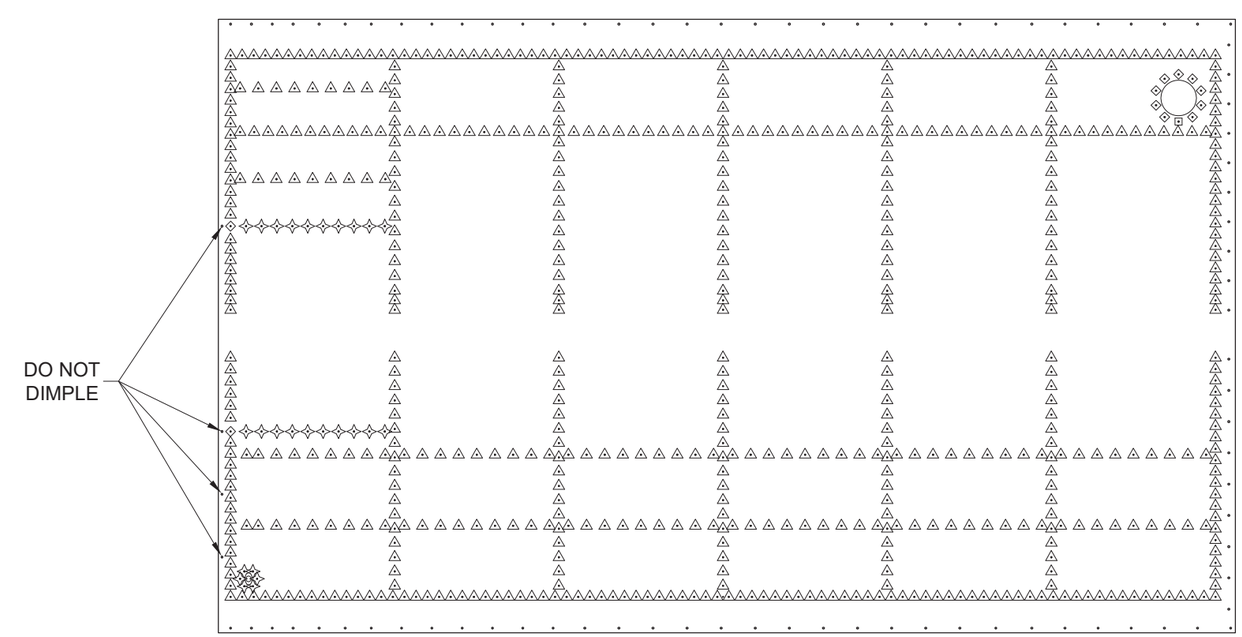
Step 11: Rivet the T-1009 Tank J-Channel to the T-1001-L Tank Skin as shown on Page 18-3, Figure 2. See Figure 3 for rivet call-outs.

To minimize mess, it is recommended to apply the sealant to the tank skin as opposed to the J-stiffener. Hold the J-stiffener away from the skin while sliding it into place to avoid smearing sealant.

Step 12: Rivet the T-1005-L Tank Attach Bracket Sub Assembly to the T-1001-L Tank Skin as shown on Page 18-3, Figure 2. See Figure 3 for rivet call-outs.

Cleco, but do not rivet the tank attach bracket to the inboard nose rib.

FIGURE 3: FUEL TANK SKIN RIVET DIAGRAM



Step 1: Install Snap Bushings into holes pre-punched in the T-1004 Tank Interior Ribs and T-1008 Vent Clip as shown in Figure 1.

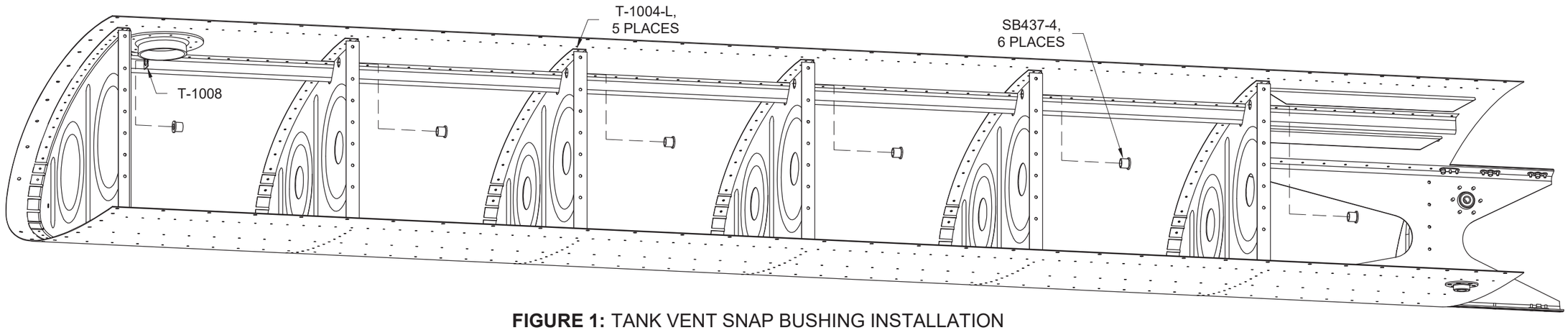


FIGURE 1: TANK VENT SNAP BUSHING INSTALLATION

Step 2: Fabricate the Fuel Vent Line by cutting a piece of 1/4 inch O.D. X .032 W soft aluminum tube 63 inches long. Read Section 5P for more information on Aluminum Tubing. Place an AN818-4D Nut and AN819-4D Sleeve on one end of the tube and flare the end of the tube.

Step 3: Install the vent line into the tank by inserting the un-flared end into the snap bushing in the most inboard tank interior rib and feeding it through the rest of the snap bushings in the ribs and finally through the snap bushing in the vent clip installed under the fuel cap flange. See Figure 2.

Hand-bend the vent line tube as required in the most outboard rib bay to allow the vent line to pass through the rib snap bushing and into the vent clip snap bushing. Hand-bend the vent line tube in the most inboard rib bay to align the flared end of the tube with the bulkhead fitting that will be installed into the inboard tank end rib.

Step 4: Install the AN832-4D Bulkhead Union and AN924-4D Nut on the T-1003B-R tank end rib as shown in Figure 2.

Step 5: Rivet the T-1003B-R Tank Inbd Rib - Aft sub-assembly to the T-1001-L Fuel Tank Skin and T-1005-L Tank Attach Bracket as shown in Figure 2. See page 18-5, Figure 3 for rivet call-out.

Step 6: Thread the AN818-4D Nut onto the AN832-4D Bulkhead Union and torque the nut. Adjust the bend in the vent line if/as required to align the nut and bulkhead union. Double-check that the nut is torqued properly because this is the last time that it can easily be done.

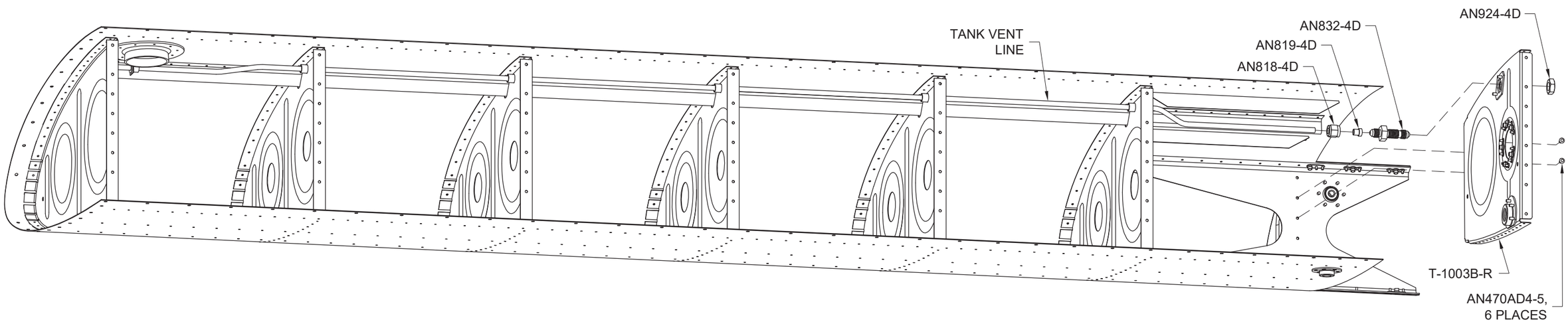


FIGURE 2: TANK VENT LINE AND INBOARD END RIB INSTALLATION

NOTE: The fuel level sender units are not provided with the kit but are available in VAN'S AIRCRAFT ACCESSORIES CATALOG. Use part number IE-385B for the left fuel tank; use part number IE F-385C for the right fuel tank.

NOTE: The bend geometry of the left fuel sender float is different than the geometry of the right fuel sender float. Special care must be taken to follow the specific bending instructions for each tank shown on Page 18-9.

Step 1: Bend the sender unit float wire to fit the fuel tank as shown on Page 18-9. Install the bent wire to the sender.

Step 2: Temporarily install the IE F-385B fuel level sender as shown in Figure 1 and Figure 2. Do not use tank sealant for this initial installation.

Adjust the float wire bends if/as required to match the full travel of the float arm to the full height of the tank.

Make sure that the float clears the vent line and upper tank stiffener as shown in Figure 2. Bend the float wire if/as required to center the float in the gap between the flange of the aft upper tank stiffener and the vent line.

Step 3: Final install the IE F-385B Fuel Level Sender as shown in Figure 1 and Figure 2. Use tank sealant for this final installation.

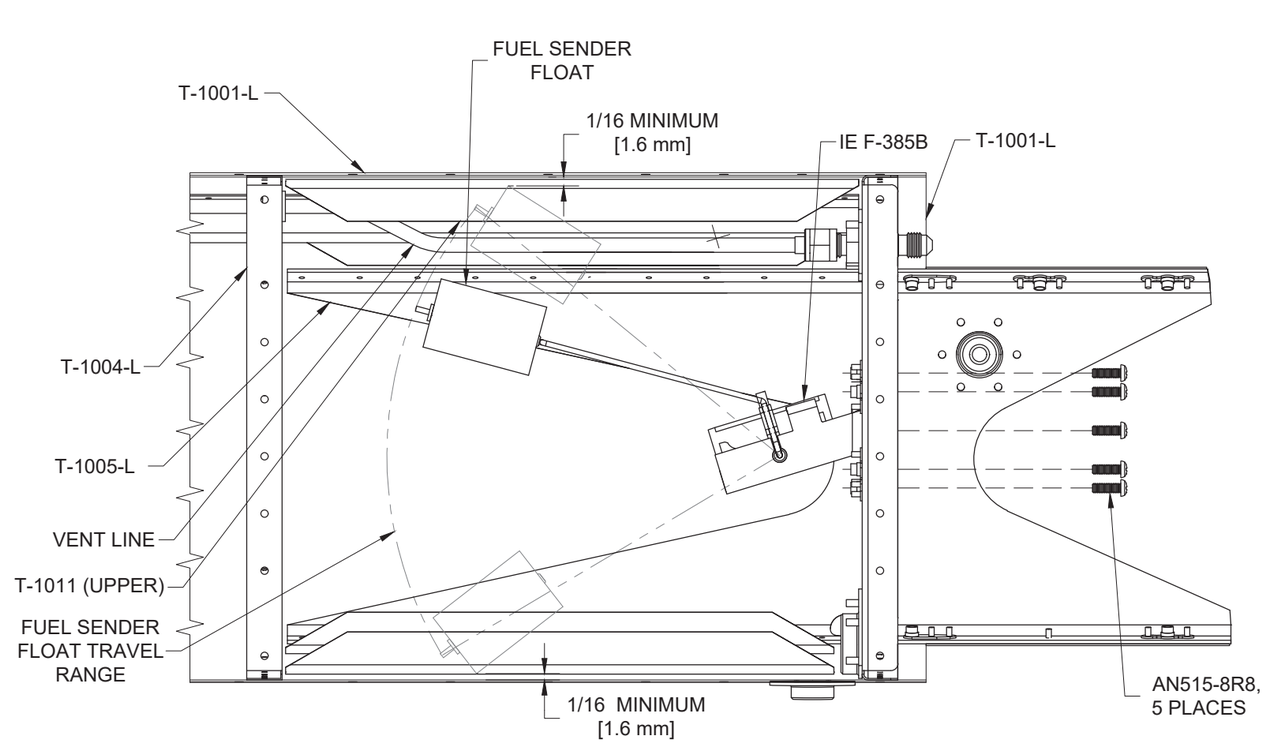


FIGURE 1: FUEL LEVEL SENDER INSTALLATION REAR VIEW

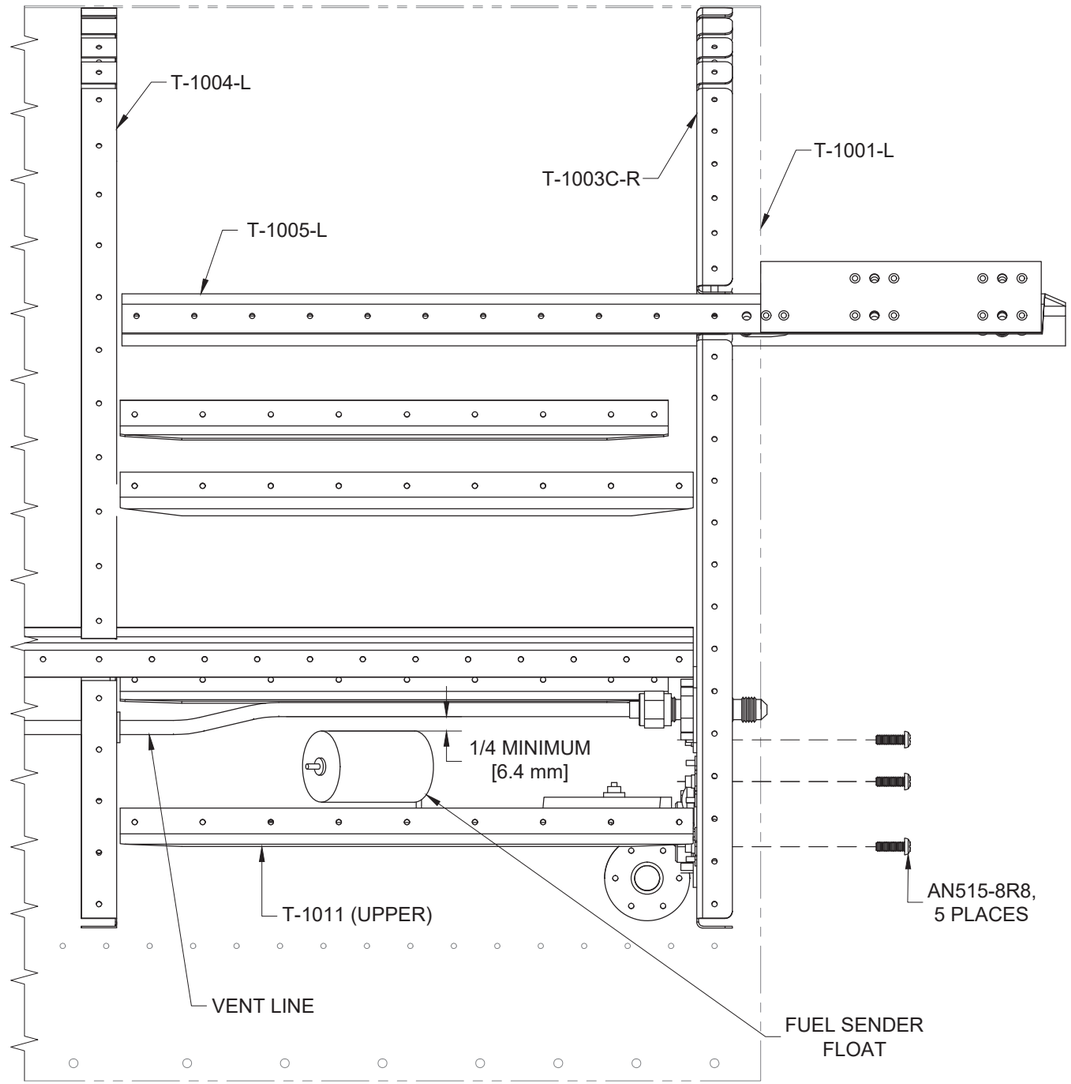


FIGURE 2: FUEL LEVEL SENDER INSTALLATION PLAN VIEW

Step 1: Apply sealant to the T-1001-l Fuel Tank Skin from the T-1002 Tank Baffle rivet holes forward. Upon installation the tank baffle acts as a squeegee and the bead of sealant will be pushed ahead as the baffle is moved forward. Use a maximum of 3/16" bead of sealant; too much and the thickness can start to build-up making the tank difficult to install on the wing. Put a bead of sealant along the inside edge of the flange on each end rib. Put a heavy glob of sealant where each corner of the baffle will meet the end ribs (this is one of the most common locations for leaks).

Put a thin smear of sealant around each of the rivet holes on the back flanges of the tank ribs.

With the tank sitting in the Leading Edge Assembly cradle, install the rear baffle by dropping it straight down on the the rear flanges of the ribs as shown in Figure 1.

Put a cleco in every hole of the tank skin to baffle joint. After clecoing, inspect the skin to see if it is pillowed-out between the clecos.The contact surface of the tank baffle flange may require pressure to force out excess sealant. The easiest method to squeeze-out the excess is to apply a c-clamp or strong spring clamp between each set of rivets. If you are unsure, clamp the flange in a couple of spots and see if it makes a difference.

Step 2: Install the rivets attaching the T-1002 Tank Baffle to the T-1003 and T-1004 Fuel Tank Rib flanges as shown in Figure 1. Twirl the closed-end blind rivets in sealant just before installation. The solid rivets that are installed through the end ribs need not be twirled in sealant.

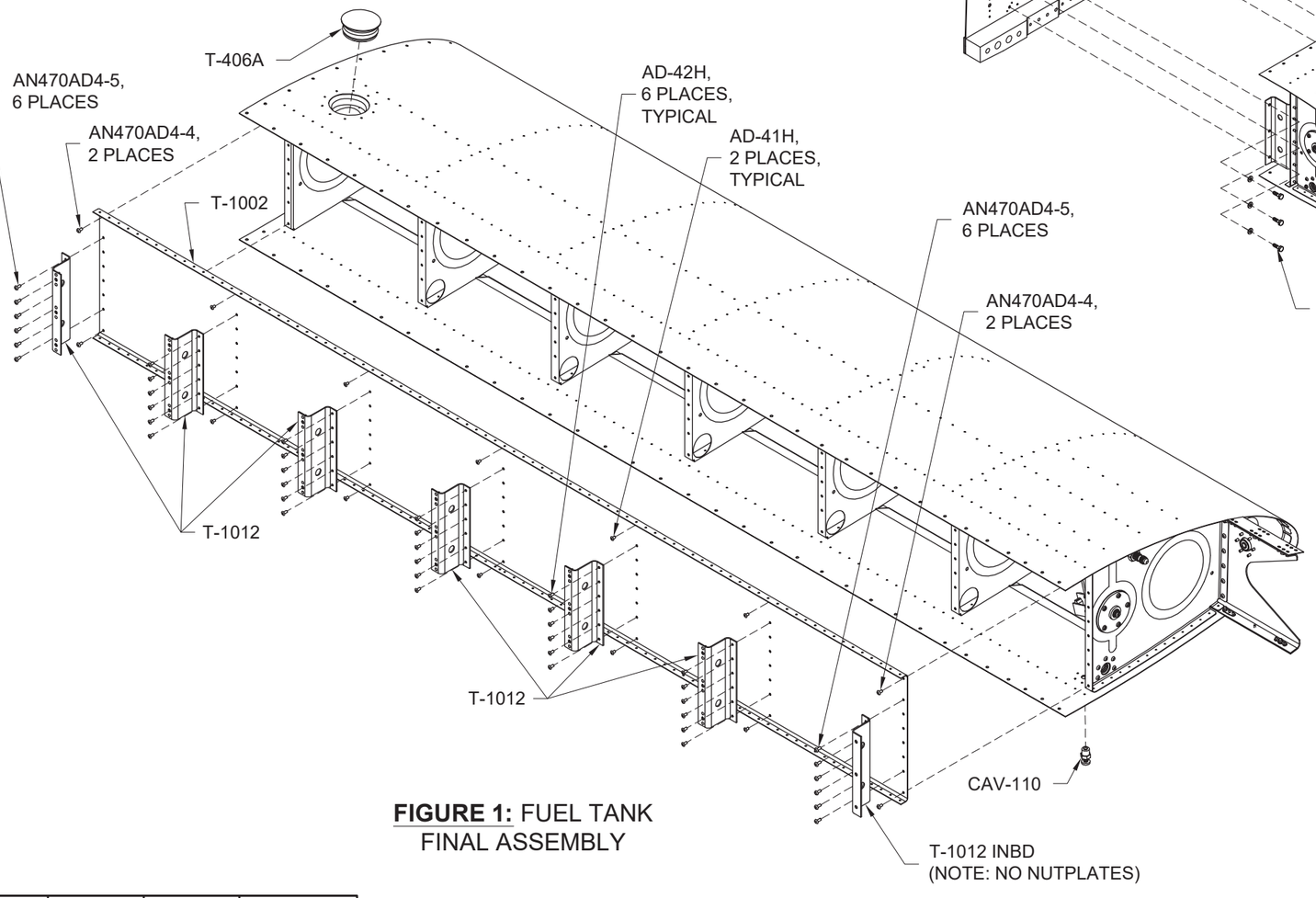


FIGURE 1: FUEL TANK FINAL ASSEMBLY

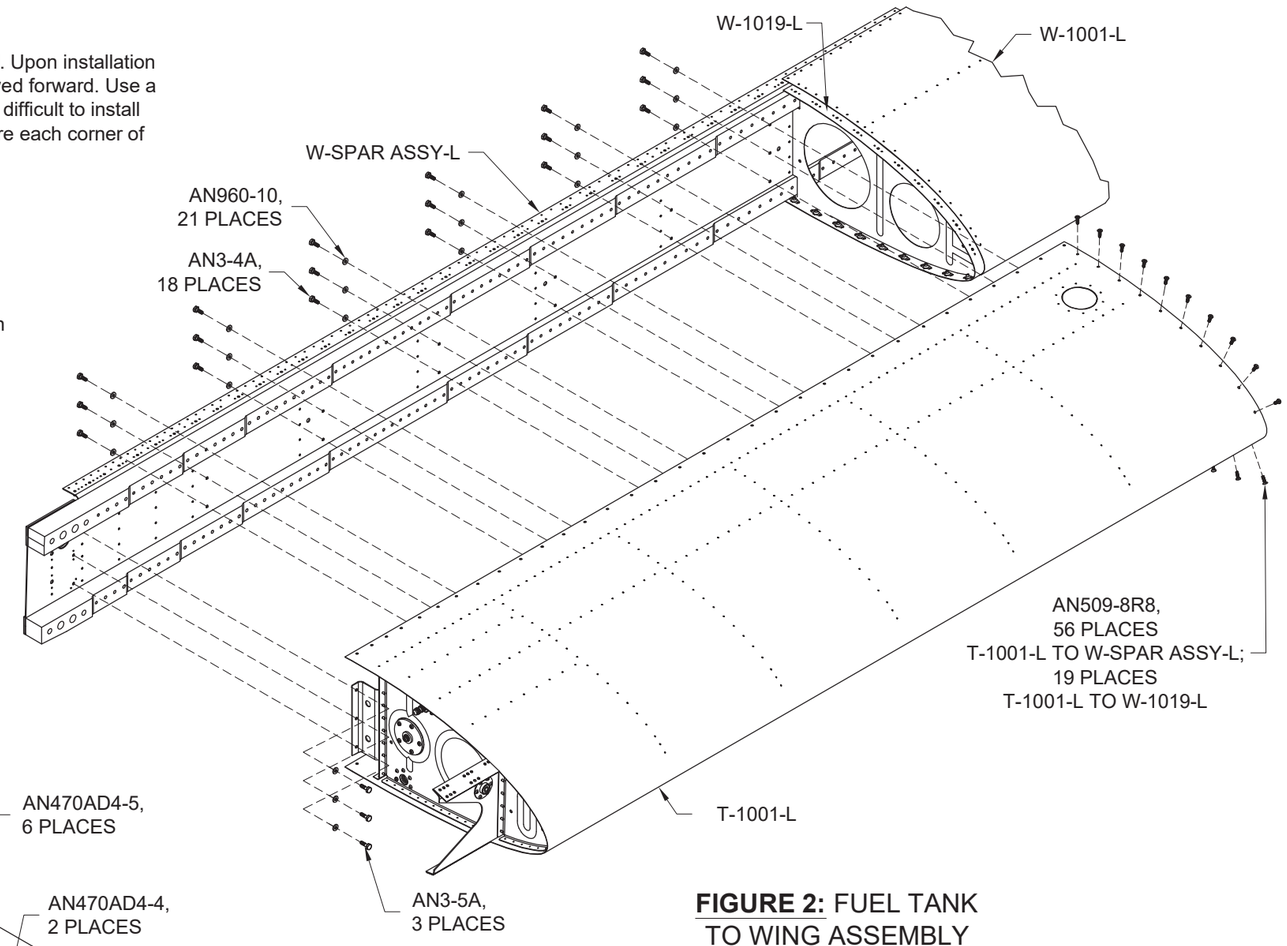


FIGURE 2: FUEL TANK TO WING ASSEMBLY

Step 3: Apply a thin smear of sealant over each hole for mounting the T-1012 Tank Attach Zee's. Cleco the tank attach zee's in place. Check for proper tank attach zee orientation as shown in Figure 1.

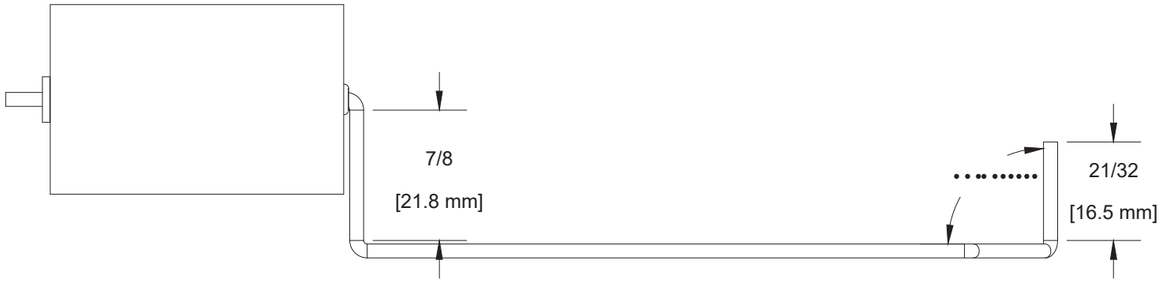
Install the tank attach zee to tank baffle to rib flange rivets as shown in Figure 1. Twirl the closed-end blind rivets in sealant just before installation. The solid rivets that are installed through the end ribs need not be twirled in sealant.

Step 4: Install rivets attaching the T-1001-L Fuel Tank Skin to T-1002 Tank Baffle in all skin holes that have been countersunk. See Page 18-5, Figure 3 for rivet call-outs. After sealant has cured, machine countersink the remaining skin holes and install rivets.

Step 5: Install the T-406A Fuel Cap and CAV-110 Drain Fitting as shown in Figure 1.

It is recommended to use a cut-off rubber glove finger or similar cover over the open end of the vent line. This is to keep debris and/or nesting insects from blocking the vent line.

Step 6: Install the tank to the spar and leading edge sub-assembly as shown in Figure 2.



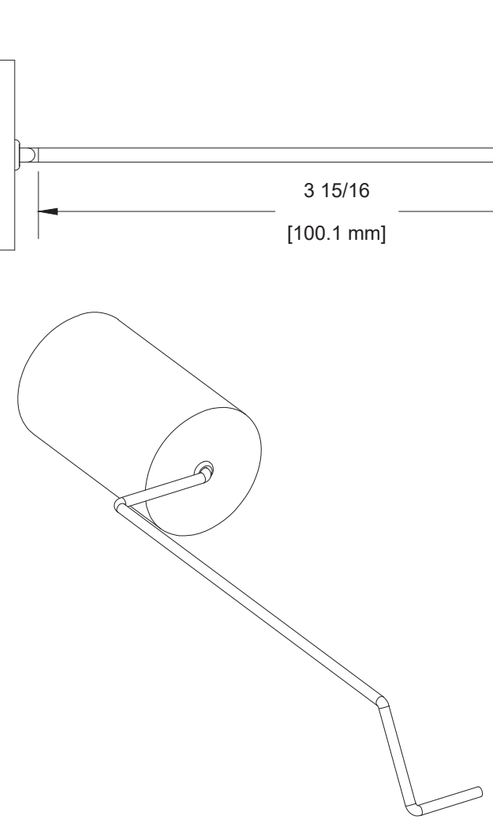
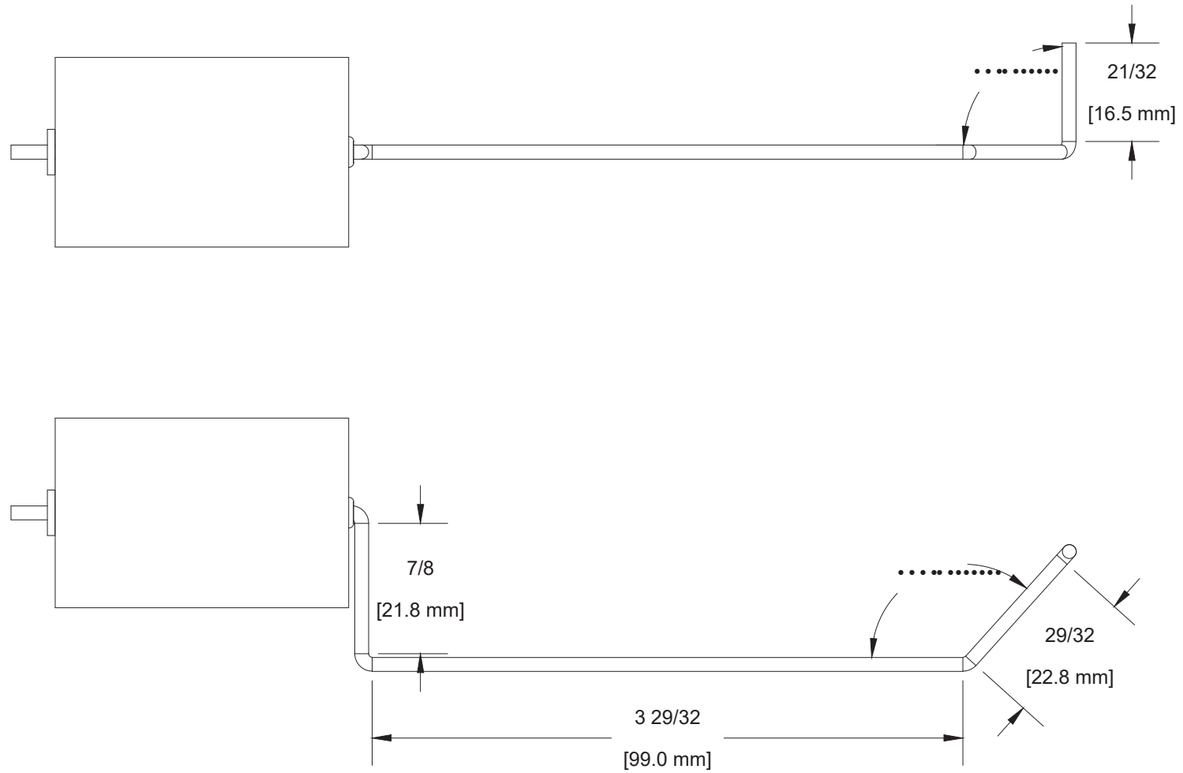


FIGURE 1: FLOAT WIRE BENDS, LEFT TANK
(NOTE: CHECK PRINTED SCALE 1:1 PER SECTION 3 BEFORE USING THE TEMPLATE



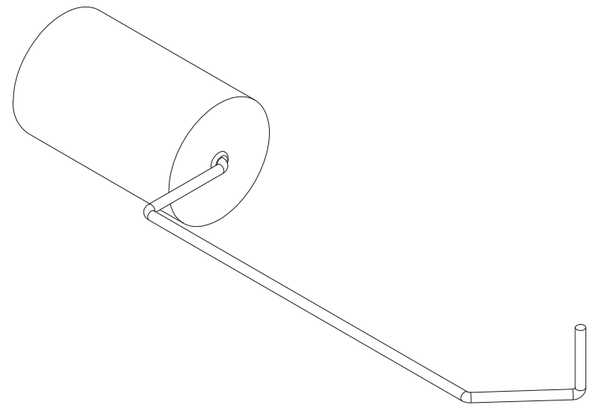


FIGURE 2: FLOAT WIRE BENDS, RIGHT TANK
(NOTE: CHECK PRINTED SCALE 1:1 PER SECTION 3 BEFORE USING THE TEMPLATE

16
[406,4 mm]