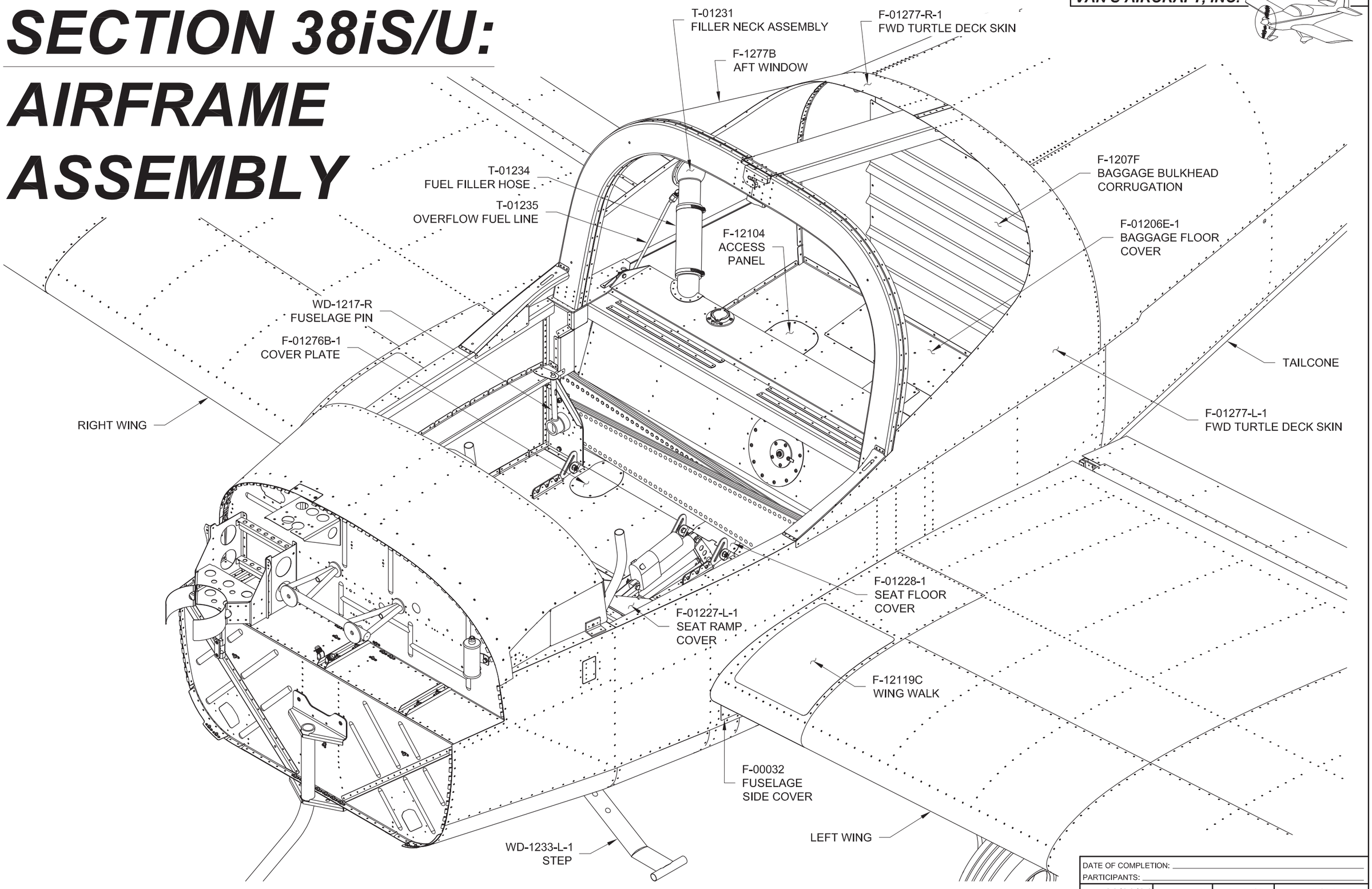
SECTION 38iS/U: AIRFRAME ASSEMBLY



DATE OF COMPLETION: _____

PARTICIPANTS: _____

Step 1: Tap the hole in both WD-1217Cs as called out in Figure 1.

Step 2: Insert the compression spring and WD-1217C into the WD-1217.

Slide the bushing onto the screw and apply a small amount of Loctite #242 (or equivalent non-permanent thread lock) to the screw threads.

Insert the screw through the WD-1217 and into the tapped hole in the WD-1217C as shown in Figure 1. Do not over tighten the screw; the WD-1217C must be able to slide within the WD-1217.

The Right Fuselage Pin is shown in Figure 1, repeat the process for the Left Fuselage Pin inserting the screw on the opposite side.

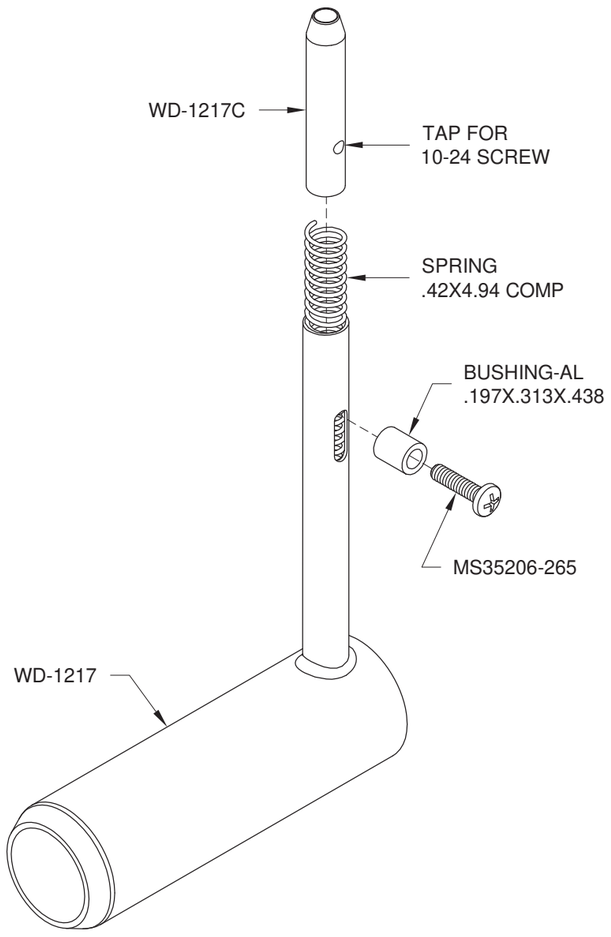


FIGURE 1:
RIGHT FUSELAGE PIN

Step 3: Place a layer of carpet or an old blanket on the work surface. Lay the left wing upside-down on the covered work surface and position the left flaperon as shown in Figure 2. Using the hardware called out, attach the flaperon to the wing and install the A-1211.

Step 4: Align the flaperon with the wing and tape the outboard edge of the flaperon to the wingtip using duct tape or similar tape. This will prevent the flaperon from swinging freely as the wing is moved. The flaperon must be secured or held any time the wing is moved after the flaperon is installed. When installing the wings with the flaperons attached, the person at the wingtip may hold the flaperon with one hand to prevent it from swinging freely.

Step 5: Repeat Step 3 and Step 4 for the right wing and flaperon.

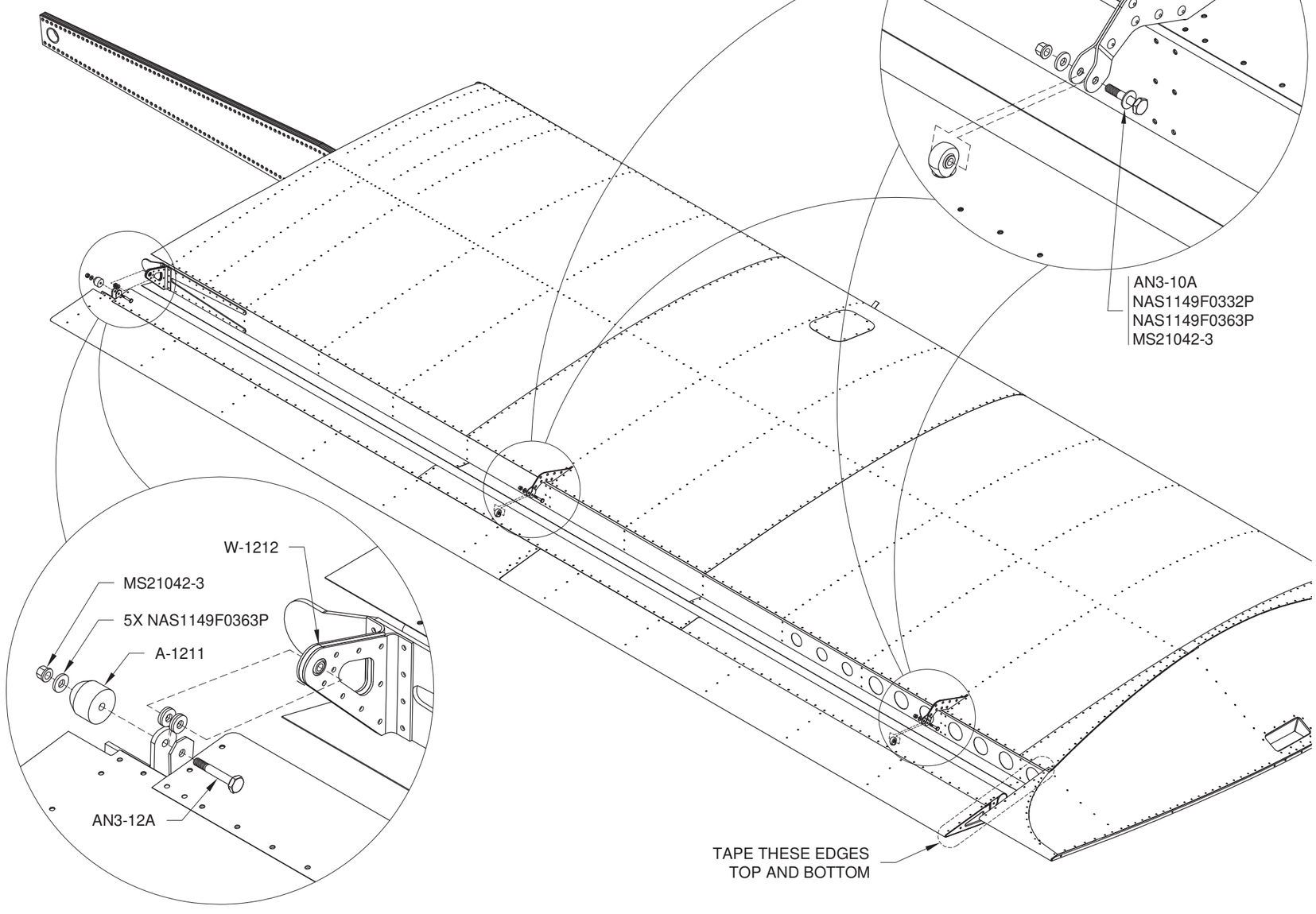


FIGURE 2: FLAPERON INSTALLATION

Step 1: Cut the F-1261 into four individual parts as shown in Figure 1

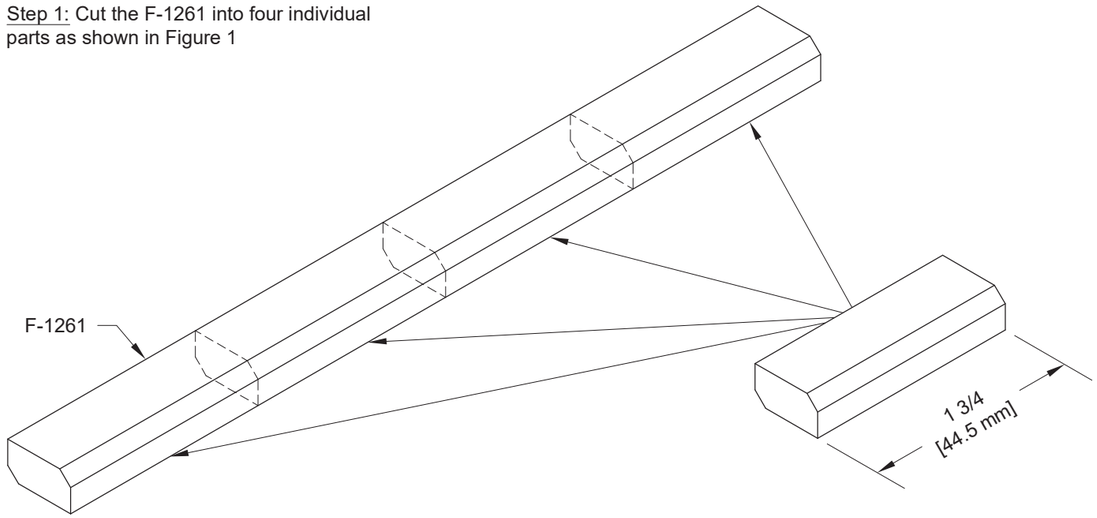


FIGURE 1: CUTTING THE F-1261 SPACER

Step 2: Position the F-1261s as shown in Figure 2, then match-drill #30 the two holes in both sides of the WD-01214-L-1 & -R-1 into the F-1261s.

Step 3: Remove the F-1261s from the WD-01214-L-1 & -R-1, then final-drill #12 the two holes in each F-1261. **DO NOT** drill the WD-01214-L-1 & -R-1.

Step 4: Scuff the mating surfaces, then epoxy the F-1261s to the WD-01214-L-1 & -R-1. **DO NOT** use too much epoxy. Use a scrap piece of aluminum (or equivalent) to maintain the gap between the spacers called out in Figure 2. Before the epoxy sets, install the rivets. Allow the epoxy to fully cure.

Step 5: Ensure that the WD-01214-L-1 & -R-1 slide freely onto the A-1211 at the end of the flaperon as shown on Page 38iS/U-05, Figure 2. If they do not slide freely, first deburr the inside of the WD-01214-L-1 & -R-1 then, if necessary, lightly sand the A-1211.

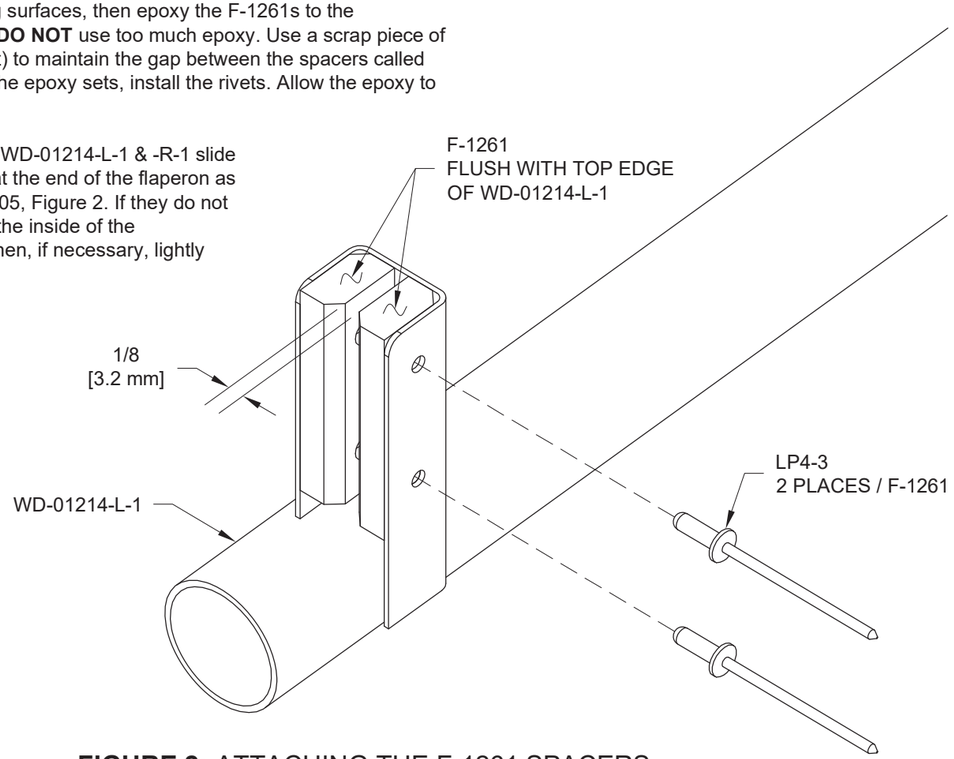


FIGURE 2: ATTACHING THE F-1261 SPACERS

Step 6: Connect the red wire on the flap motor to the minus terminal of a 12 volt battery, then hold the black wire to the plus terminal until the flap motor is fully retracted (flaps up).

Step 7: Temporarily lock the flaperon control system in the neutral position by inserting the bolt shown in Figure 3. Ensure that the bolt passes through the holes in the F-01219B-1, F-01263A-1 & B-1, and F-01219A-1.

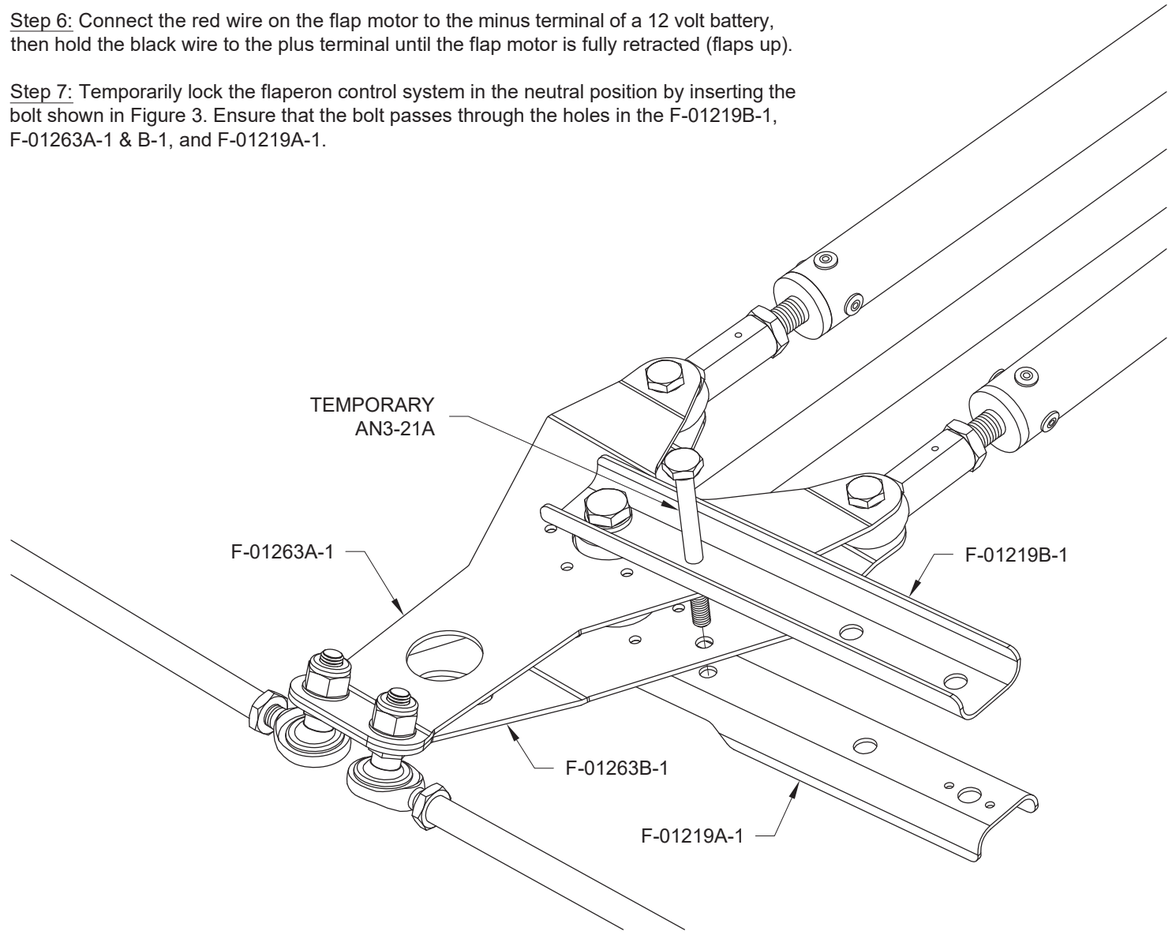


FIGURE 3: LOCKING THE FLAPERON CONTROL SYSTEM

Step 1: Place a sawhorse under the aft end of the fuselage to prevent the fuselage from tipping back while installing the wings, and reinstall clecos from the outside of the fuselage to the inside in the area of the wing-root/fuselage intersection.

NOTE: Two people are needed to install and remove the wings. One person should stand forward of the wing spar at the fuselage to guide the spar into position and set the fuselage pins. The second person should be at the wing tip to lift and slide the wing into position. The person at the fuselage side will watch that the spar is properly aligned, that the stub spars are lined up with their receptacles, and direct the person at the wing tip as needed.

Step 2: With one person at each end of the wing, guide the left wing spar into the slot in the side of the fuselage. The wing spar should slide over the F-1204M Roller and under the F-1204R Retainer Block on the opposite side (retainer blocks are on both sides of the aircraft). The retainer block will hold the wing in place while the Left and Right Fuselage Pins are installed; see Figure 1.

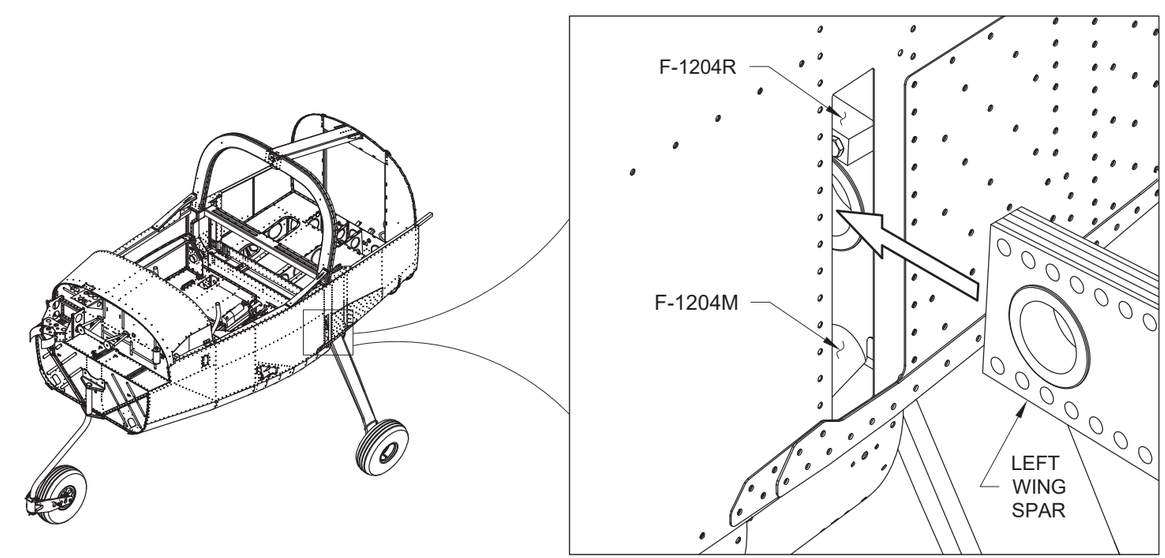


FIGURE 1: WING SPAR RECEPTACLE

NOTE: If the wing skins interfere with sliding the wings into place, they may be carefully filed/trimmed until the fuselage pins will engage the wing spar. Remove any clecos that interfere with the wing skins. If the stub spars interfere with installation of the wing, they may require local dressing with a file. Before dressing the stub spars, however, make sure there are no other causes preventing the fuselage pins from engaging, such as interfering rivet heads or obstructing foreign objects. The stub spars are to be coated with a multipurpose anti-seize paste to prevent fretting/wear (delay until after painting).

Step 3: Insert the stub spars into the forward and aft stub spar receptacles as shown in Figure 2. Apply a light coating of general purpose wheel bearing grease to the Left and Right Fuselage Pins then insert them through the bushings in the F-1204CL-L & -R. Push the pins into the wing spar bushings but not beyond the aft surface of the spar. The fit will be snug. Twisting the fuselage pins while applying pressure will make installation easier.

Step 4: Place a padded stand (preferably adjustable) under the left wing as shown in Figure 2. Take care that the stand is aligned with a wing rib (not between ribs) to avoid denting the wing skins. The stand may alternately be positioned under the optional eye bolt tie-down ring (eye bolts are not included in the kit, but are available from our accessories catalog and other sources).

Step 5: With one person on each end of the right wing, slide the right wing spar over the F-1204M Roller and under the F-1204R Retainer Block on the opposite side; see Figure 1. Slide the fuselage pins through the bushings in both wing spars and latch them to the F-01248B-1. Be sure the fuselage pins are on the correct side with the retaining screws positioned outboard as shown in the top detail view of Figure 2; this will prevent them from being depressed accidentally.

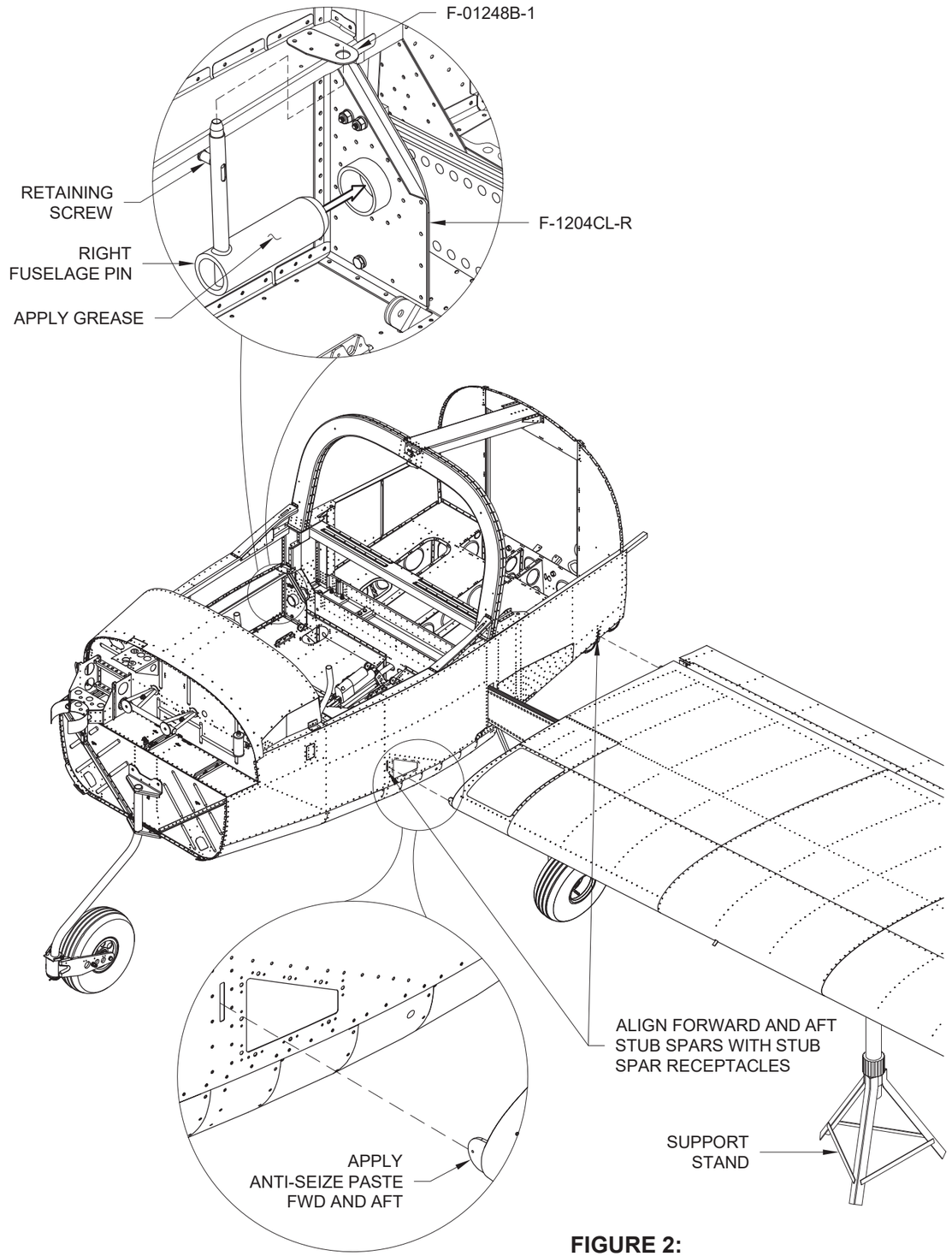


FIGURE 2:
WING INSTALLATION

Step 1: Lubricate both A-1211s and the A-1207-L & -R with general purpose wheel bearing grease; see Figure 2.

Step 2: Remove the tape securing the tip of the flaperon to the wing and allow the flaperon to swing down.

Step 3: Insert the WD-01214-L-1 & -R-1 below the F-01270-L-1 & -R-1 and between the brackets of the WD-1215-L & -R as shown in Figure 1.

Step 4: Slide the WD-01214-L-1 & -R-1 outboard to engage the flaperon. The tubes of the WD-01214-L-1 & -R-1 slide over the A-1211s, and the F-1261s capture the A-1207-L & -R as shown in Figure 2.

Insert a temporary 1/16 [1.6 mm] spacer (a 1/16 drill bit works well here) between the inboard face of each A-1207-L & -R and the WD-01214-L-1 & -R-1.

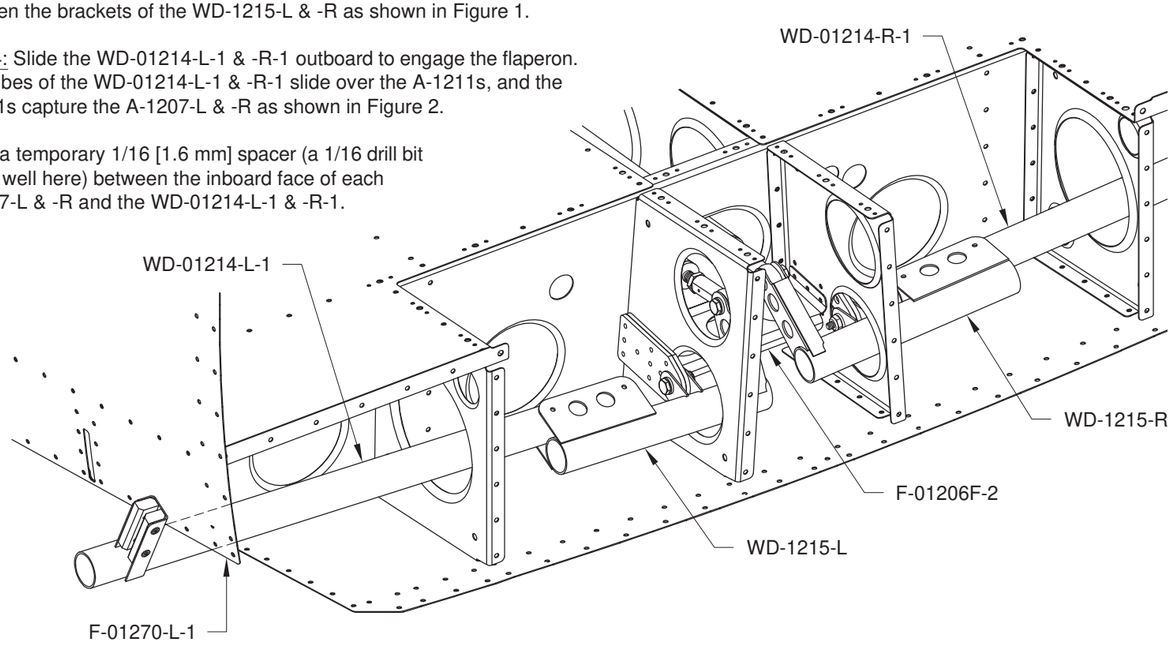


FIGURE 1: INSERTING THE FLAPERON TORQUE TUBES
(WING NOT SHOWN)

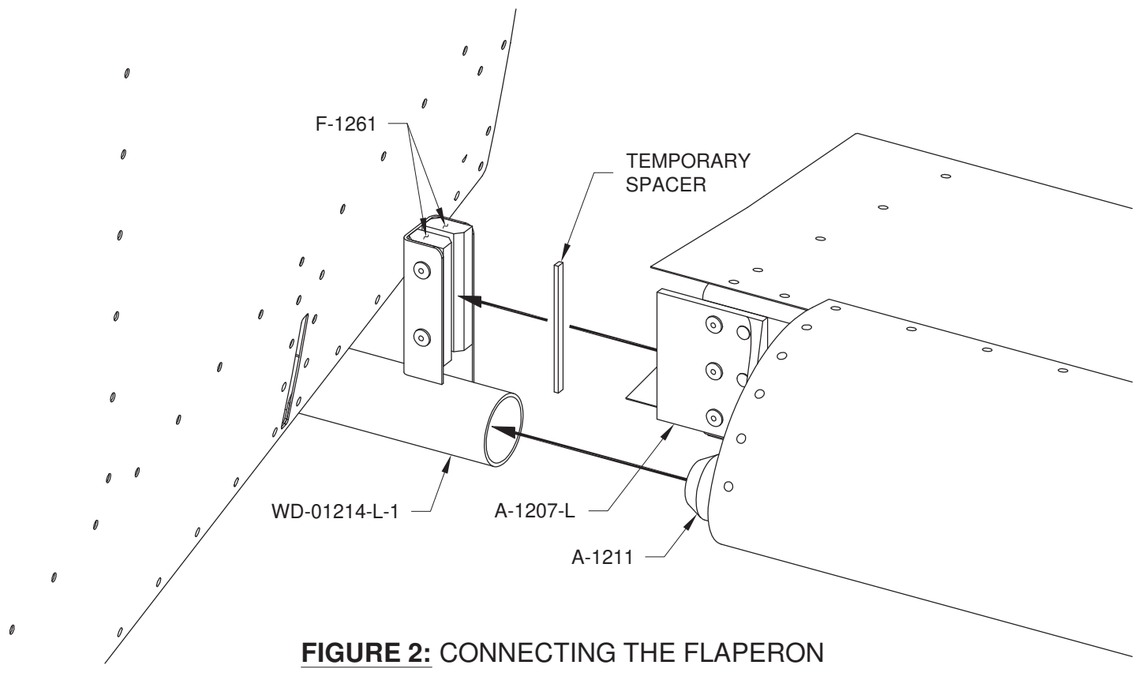


FIGURE 2: CONNECTING THE FLAPERON

Step 5: Use shims and clamps to secure the left and right flaperons in a trailing edge down position as shown in Figure 3.

The goal is to have a 1/8 in. [3.2mm] offset at the trailing edge.

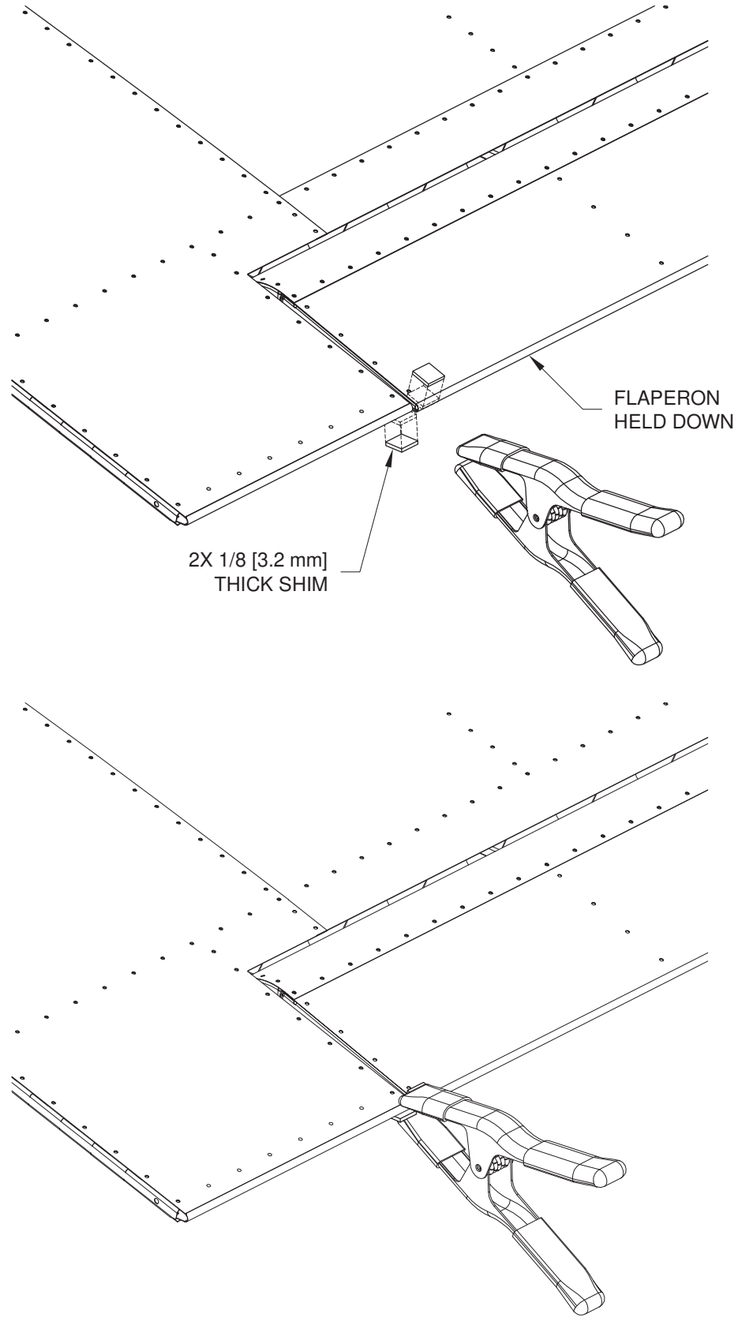


FIGURE 3: SHIMMING & CLAMPING THE FLAPERON TRAILING EDGES
(LEFT SIDE SHOWN)

Step 1: Insert temporary spacers between the WD-01214-L-1 & -R-1 and the tubes of the WD-1215-L & -R as shown in Figure 1.

Step 2: Move the WD-01214-L-1 & -R-1 outboard until they bottom against the spacers as shown on Page 38iS-05, Figure 2. Clamp the parts together as shown in Figure 1.

Step 3: Verify that the arms of the WD-1215-L & -R are exactly parallel to each other. This can be accomplished by measuring the distance between the F-01206F-2 and the attach bolts for the Flaperon Pushrod Assemblies. The measurement must be the same for both arms; see Figure 2 and Page 38iS/U-05, Figure 1. If they are not parallel, make sure the F-01263A-1 & B-1 are centered (see Page 38iS/U-03, Figure 3) and, if necessary, readjust the lengths of the Flaperon Pushrod Assemblies to the dimensions given on Page 32iS/U-09, Figure 1.

Step 4: Match-Drill #30 the two accessible (upper) holes of the WD-1215-L into the WD-01214-L-1. Only drill the two holes, cleco the first hole before match-drilling the second. Repeat for the right side.

Step 5: Remove the WD-01214-L-1 & -R-1 and WD-1215-L & -R from the fuselage.

Step 6: With the support stand positioned under the left wing and a helper holding the right wing tip, slip the fuselage pins out (the retainer blocks will hold the wings in place while removing the fuselage pins) and remove the right wing. Remove the left wing.

Step 7: On a work bench, and with the spacers in place, cleco together the WD-01214-L-1 & -R-1 and WD-1215-L & -R using the previously match-drilled holes. Reapply the clamps.

Step 8: Match-Drill #30 the two holes in the other (lower) side of the WD-1215-L & -R into the WD-01214-L-1 & -R-1.

Step 9: Final-Drill #12 the holes (upper and lower) in the WD-01214-L-1 & -R-1 and WD-1215-L & -R. Insert a bolt through the first series of holes before final-drilling the second series.

Step 10: Reinstall the WD-1215-L & -R as shown on Page 32iS/U-10, Figure 1.

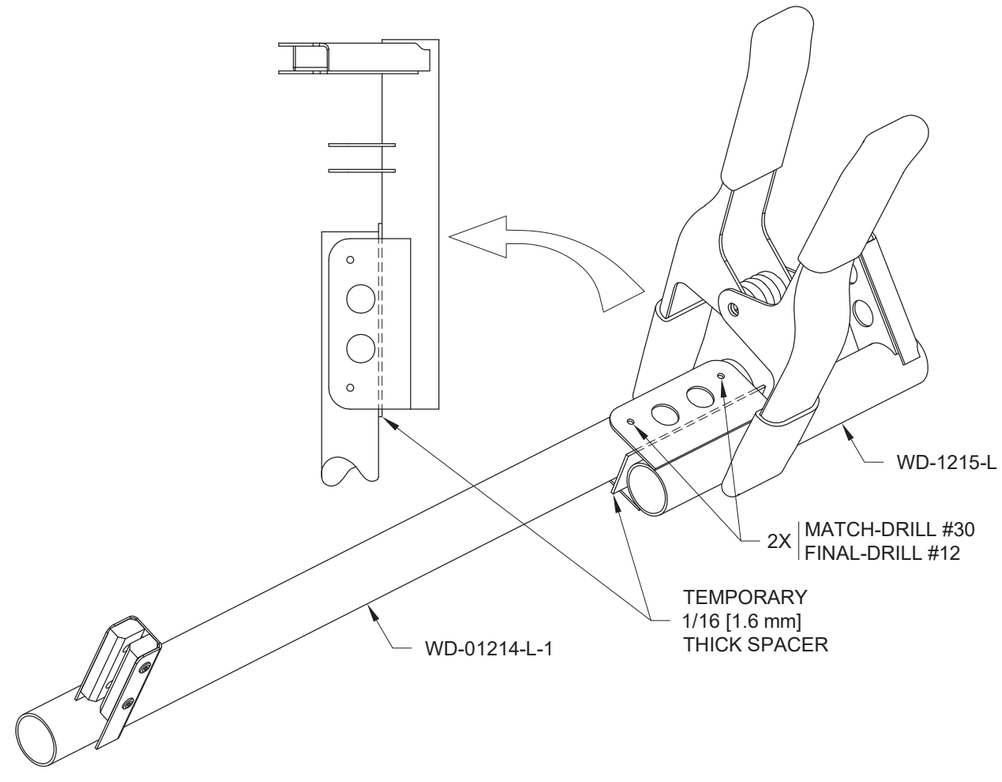


FIGURE 1: DRILLING THE FLAPERON TORQUE TUBES

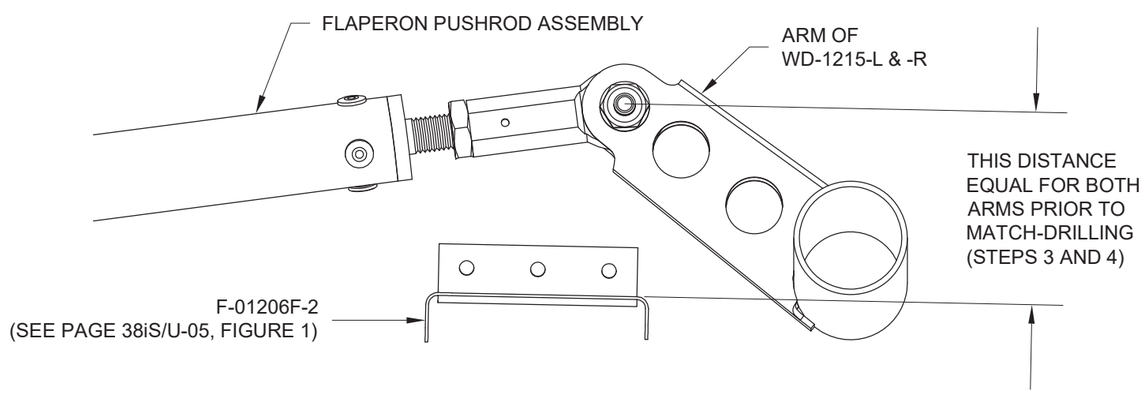


FIGURE 2: MEASUREMENT FOR THE WD-1215

NOTE: If purchased, the assembly process can be made somewhat easier by installing, to the extent possible, the avionics and wiring provided in the Avionics Kit before the tailcone is attached in this section.

NOTE (RV-12iS only): If purchased, the assembly process can be made somewhat easier by installing, according to Section 27iS, the fuel pumps and filter supplied in the Powerplant Kit before the tailcone is attached in this section.

NOTE: Remove empennage assemblies from the tailcone, refer to Section 11 - Empennage Attachment.

Step 1: Retrieve the bending tool that was fabricated on Page 17-06 and bend the forward tabs on the F-1278 and F-1279-L & -R per the angular dimensions given in Figure 1. All tabs are bent outboard.

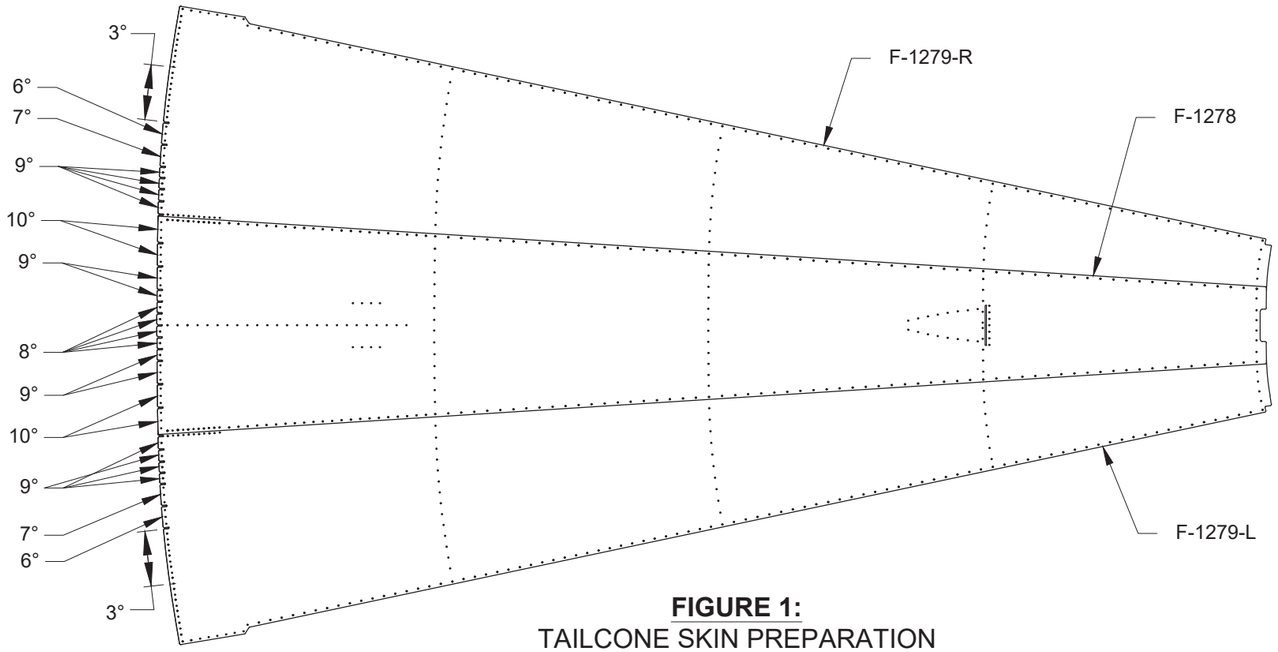


FIGURE 1:
TAILCONE SKIN PREPARATION

Step 2: Mark, then prepare the F-1207E-L & -R by removing the hatched areas shown in Figure 2.

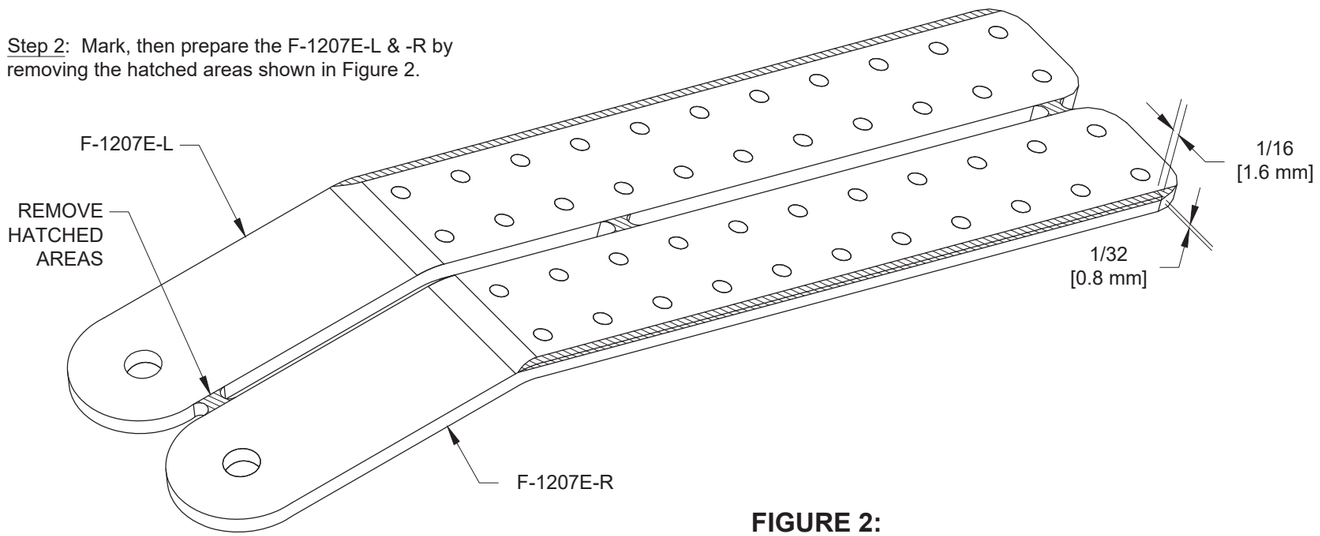


FIGURE 2:
F-1207E SHOULDER STRAP LUG

Step 3: Machine countersink the bottom of F-12350 according to Figure 5. Ensure Orientation Matches.

Attach to F-01282-L-3 as shown in Figure 3.

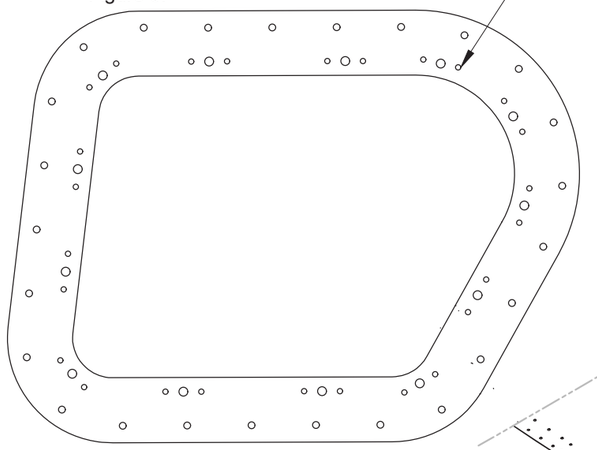


FIGURE 5:
COUNTERSINKING F-12350

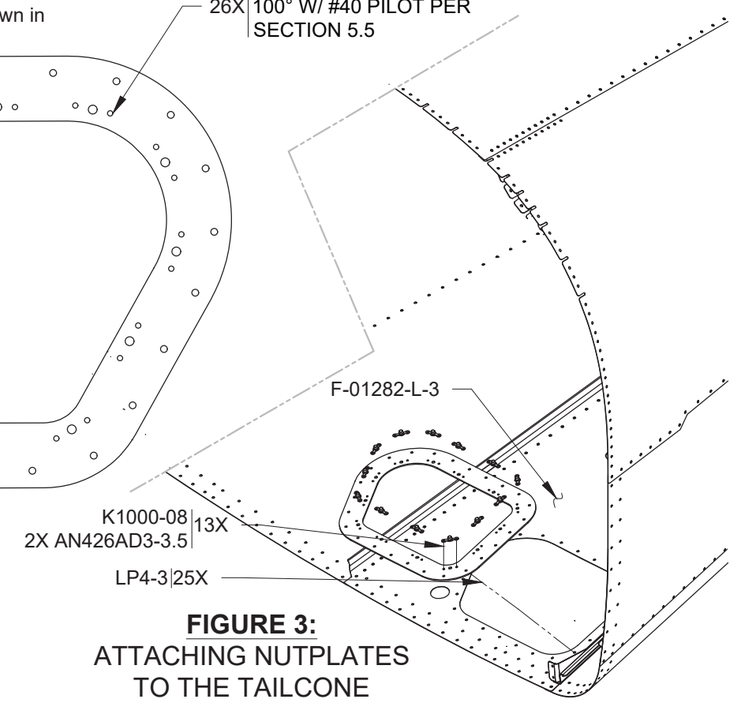


FIGURE 3:
ATTACHING NUTPLATES TO THE TAILCONE

Step 4: For the F-01273-L-1, fill the indicated #30 hole with the called out rivet. For the F-01273-R-1, final-drill the hole using a step drill. See Figure 4.

Step 5: Dimple the #40 nutplate attach rivet holes and the three indicated #30 holes in the F-01273-L-1 & -R-1, then attach the nutplates called out in Figure 4.

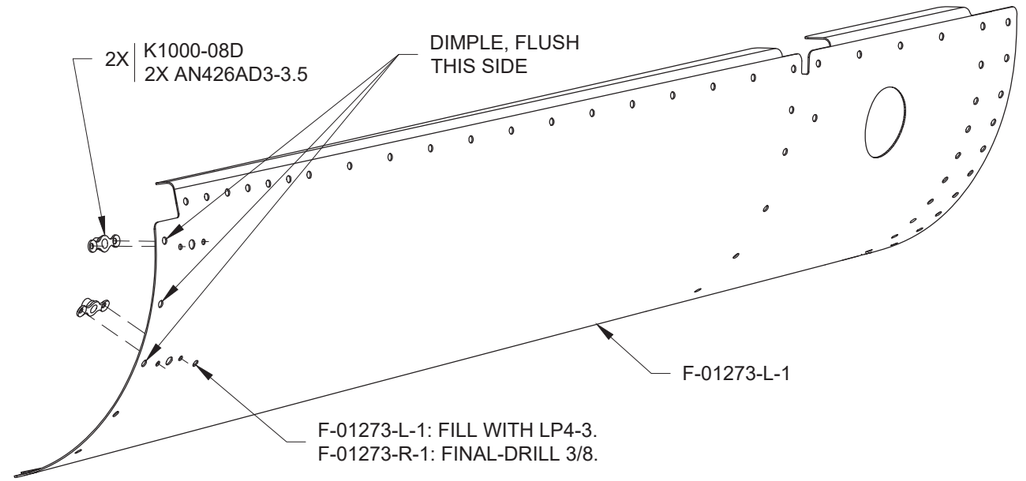


FIGURE 4: PREPARING THE BAGGAGE CORNER SKINS

CAUTION: To avoid water penetration, upper skins need to overlap outboard of lower skins and forward skins need to overlap outboard of aft skins.

NOTE: A second person assisting with attaching the tailcone will make the work much easier.

Step 1: Support the tailcone on saw horses.

Bring the tailcone to the aft of the fuselage and place the forward edge of the F-01282-L-3 & -R-1 Bottom Skins on the aft edge of the F-01276-1 Bottom Skin as shown in Figure 1. Insert the forward edge of the tailcone bottom skins between the F-01207B-2 Baggage Bulkhead and the fuse bottom skin as shown in Detail A. Cleco the tailcone bottom skins to the fuse bottom skin.

Lift the aft end of the tailcone and guide the tailcone skins outboard of the F-01255-L-1 & -R-1 Longerons and inboard of the F-01270-L-1 & -R-1 Fuselage Side Skins. The F-1279-L & -R Upper Skins are outboard of the fuselage side skins; see Page 38iS/U-09, Figure 2. Cleco the lower half of the tailcone to the fuselage in about ten places.

Shake the aft end of the tailcone up, down, left, and right to ensure that the clecos are set completely.

CAUTION: At this point, until the engine is installed, the tailcone will need to be supported to prevent the entire fuselage from tipping back. Use a padded stand (preferably adjustable) positioned so that it lines up with one of the lateral rivet patterns on the bottom of the tailcone.

Step 2: Cleco, then rivet the F-1207E-L & -R Shoulder Strap Lugs to the bottom surface of the tailcone skins using the rivets called out in Figure 2. Capture the upper flange of the F-01207D-L-1 & -R-1 Baggage Bulkhead Channels when riveting the two forward holes of the shoulder strap lugs.

Step 3: Cleco and rivet the F-01277-L-1 & -R-1 to the fuselage and tailcone and to themselves as shown in Figure 2.

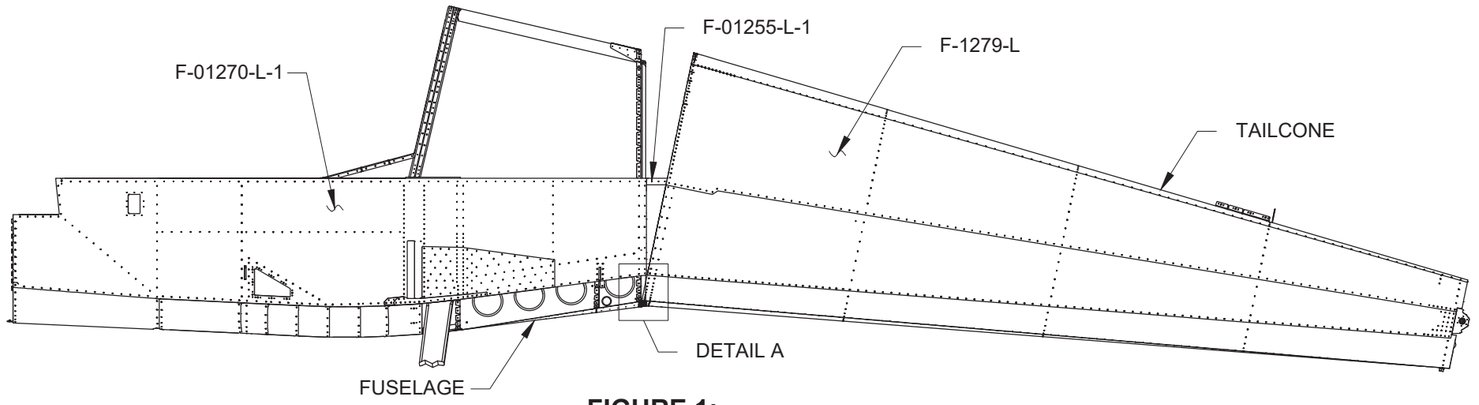
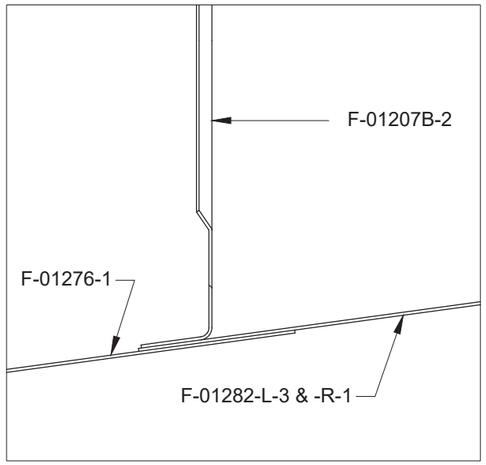


FIGURE 1:
TAILCONE ATTACH



DETAIL A

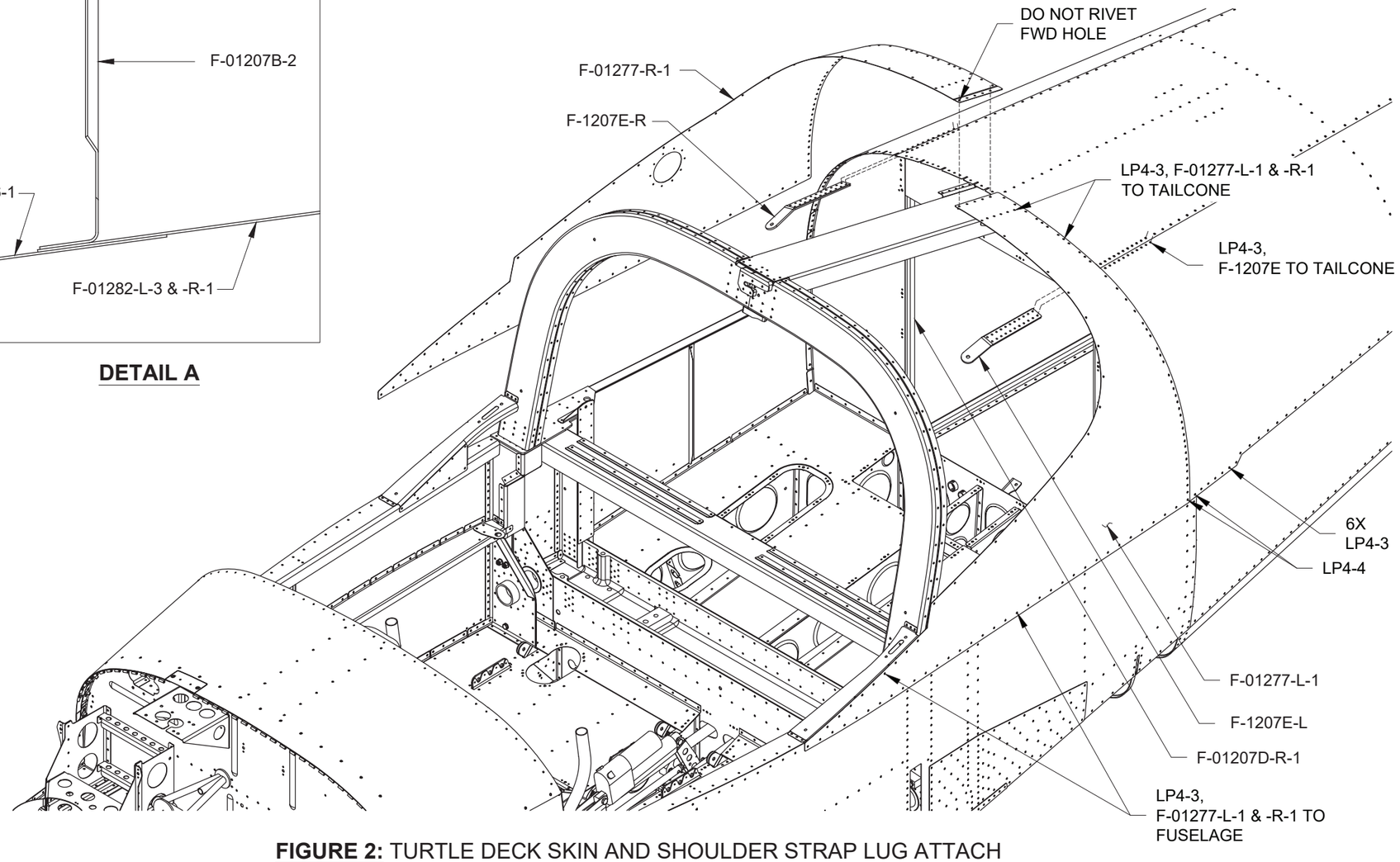


FIGURE 2: TURTLE DECK SKIN AND SHOULDER STRAP LUG ATTACH

Step 1: Match-Drill #30 the two holes in each F-01207C-L-1 & -R-1 Baggage Bulkhead into the F-1284-L & -R Shear Clips. See Figure 1.

Step 2: Rivet the F-1284-L & -R to the F-01207C-L-1 & -R-1 as shown in Figure 1.

Step 3: Cleco the F-01273-L-1 in place as shown in Figure 1. It underlaps the F-01270-L-1, F-01276-1, and F-1280-L, and overlaps the F-1281-L as shown in Figure 2. Repeat and mirror for the F-01273-R-1.

Step 4: Final-Drill #19 the two holes in the F-01270A-1 and underlying F-01270-L-1 that are called out in the detail view of Figure 2. Repeat for the right side.

Step 5: Except for indicated holes, rivet in place the F-01273-L-1 & -R-1 using the rivets called out in Figure 2, and rivet all remaining open holes associated with joining the tailcone to the fuselage .

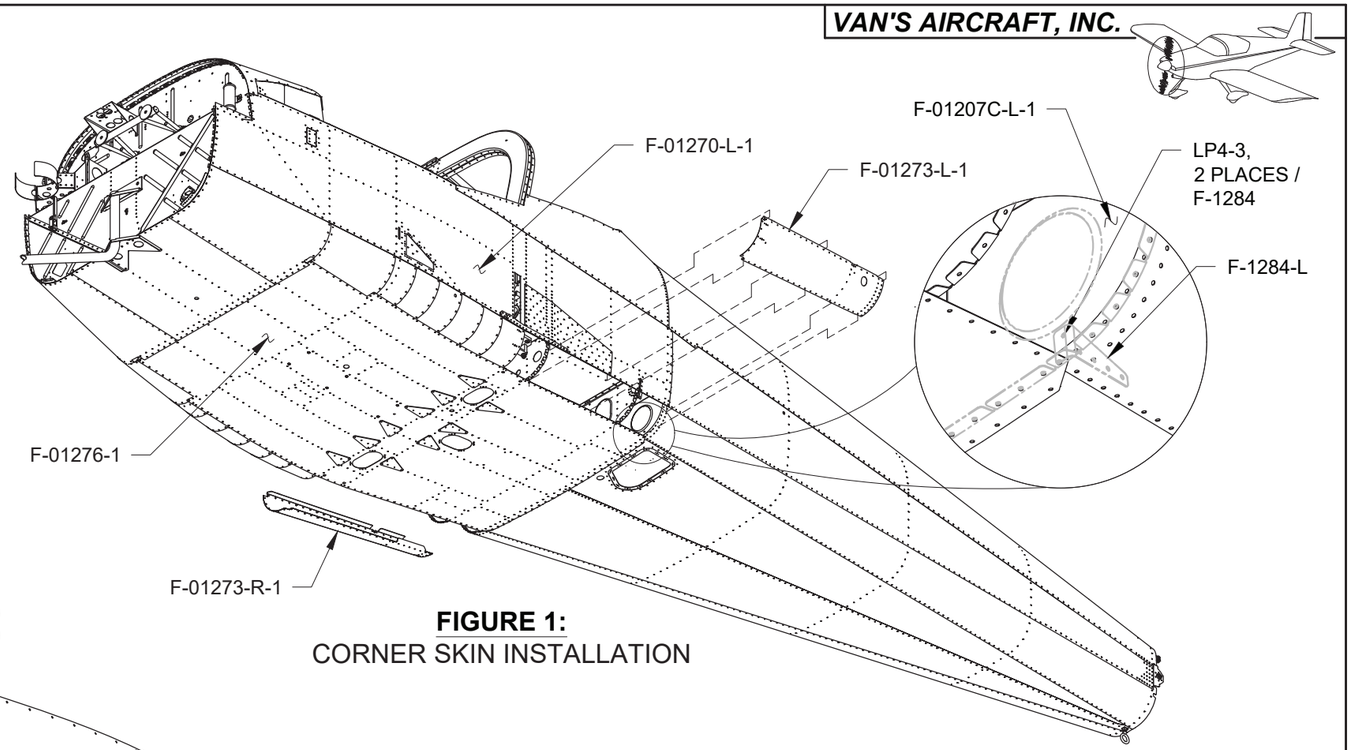


FIGURE 1:
CORNER SKIN INSTALLATION

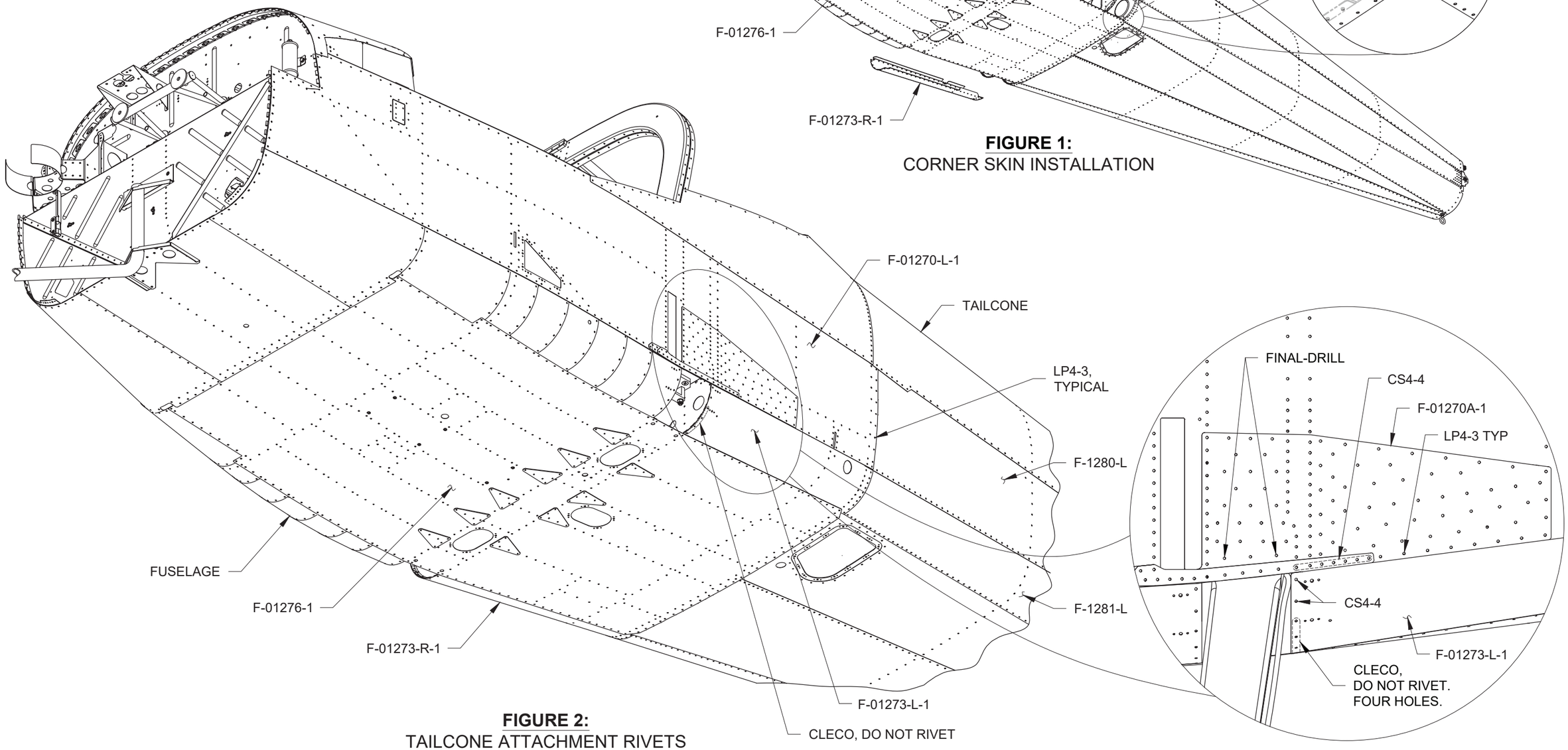


FIGURE 2:
TAILCONE ATTACHMENT RIVETS
(MAIN GEAR NOT SHOWN IN ISO VIEW)

Step 1: Cut two 3-11/16 [9.4 cm] lengths from the MS21266-1N and install them around the edges of the holes in the F-01273-L-1 & -R-1 as shown in Figure 1.

Step 2: Slide the WD-01214-L-1 & -R-1 through the F-01273-L-1 & -R-1, and attach them to the WD-1215-L & -R as shown.

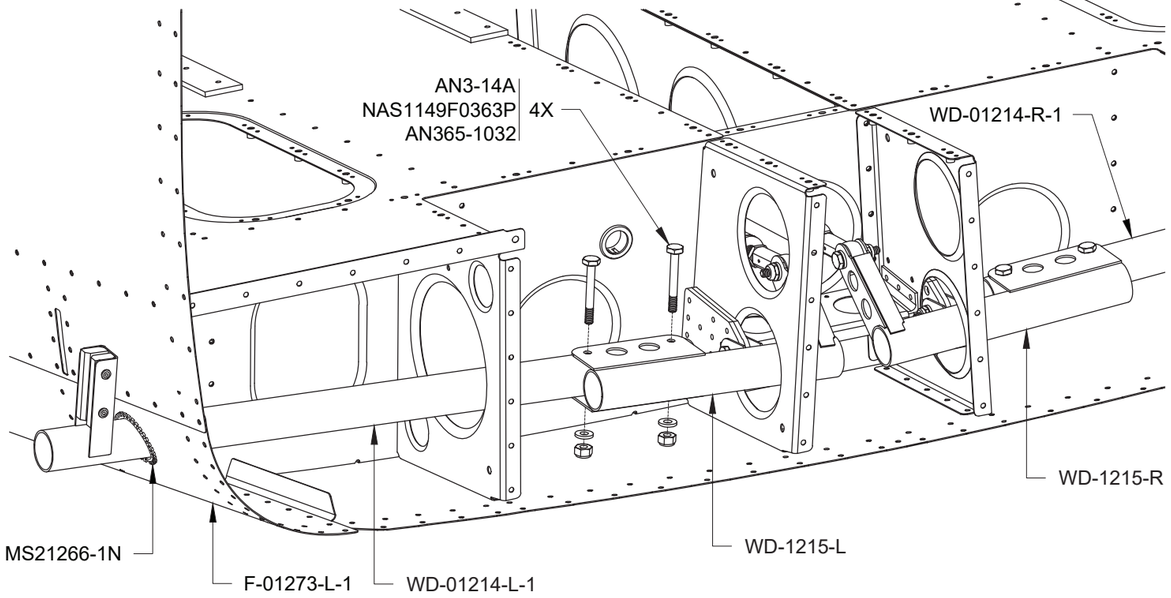


FIGURE 1: SECURING THE FLAPERON TORQUE TUBES

NOTE: Check clearance between the fuel supply line and flaperon torque tubes. Ensure at least 1/4" clearance between screw heads and the fuel line. Bend by hand as necessary.

Step 3: Separate the F-01275G-1 into left and right parts by removing the shaded areas shown in Figure 2.

Step 4: Dimple the nutplate attach rivet holes and the indicated #30 holes in the F-01275G-L-1 & -R-1, then attach the nutplates using the rivets called out.

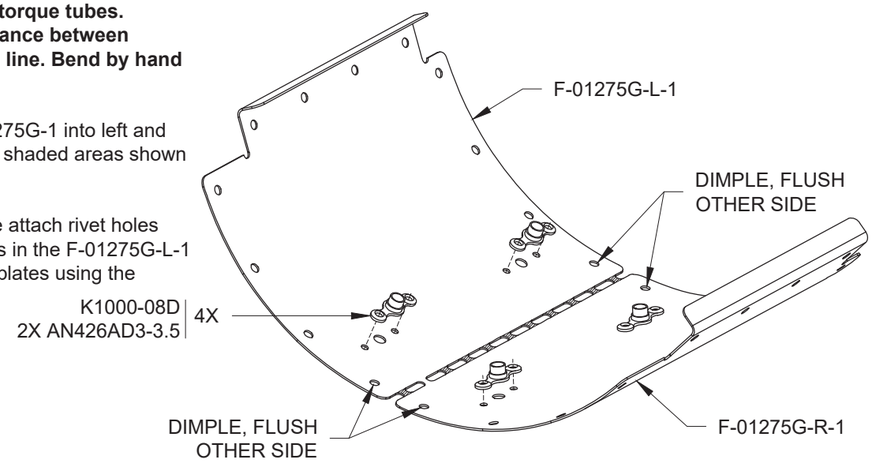


FIGURE 2: PREPARING THE F-01275G-L-1 & -R-1 COVER PLATES

Step 5: Rivet the F-01275G-L-1 to the F-01273-L-1, F-01275F-L-1, and F-01276-1 using the rivets called out in Figure 3. The bent flange is positioned on top of the F-01276-1.

Repeat for the F-01275G-R-1 on the right side.

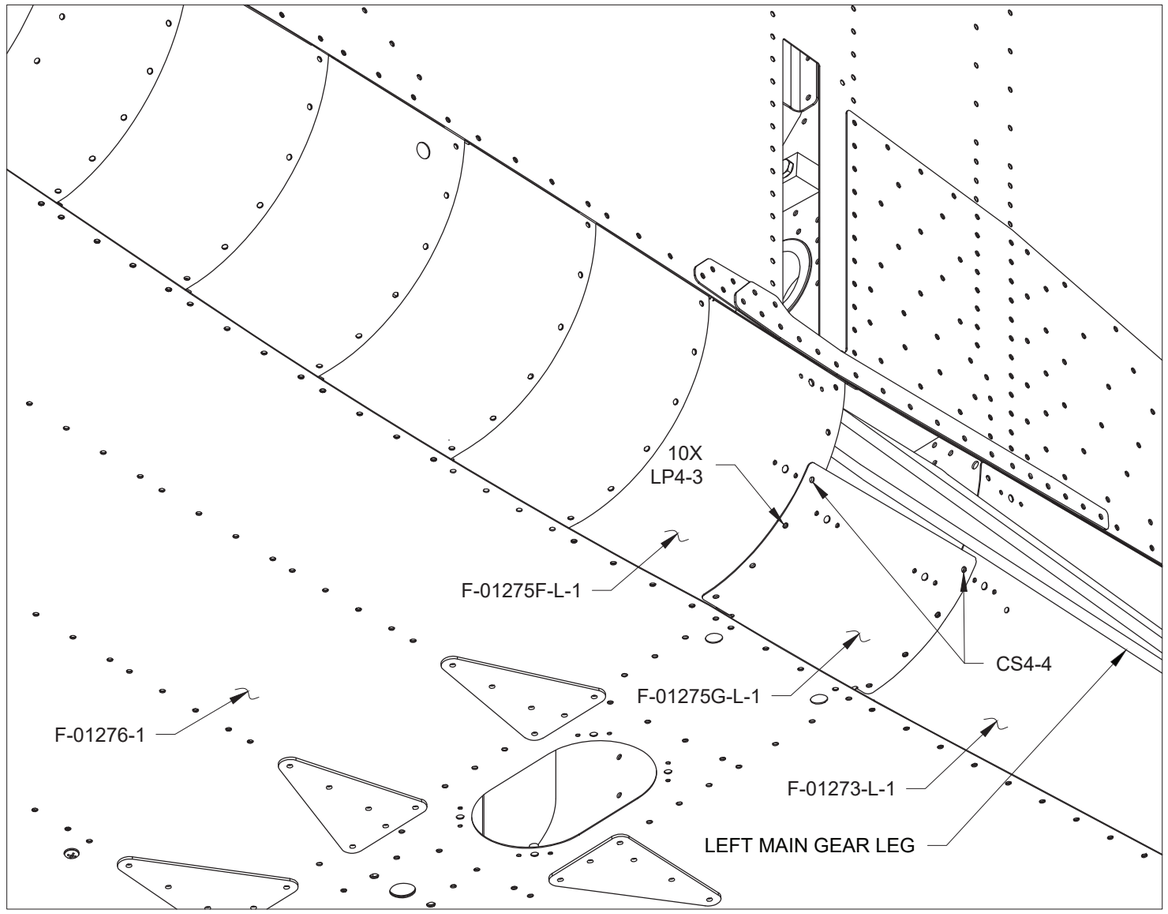


FIGURE 3: INSTALLING THE F-01275G-L-1 & -R-1 COVER PLATES

Step 1: Use the templates provided on Page 38iS/U-25 to cut out two F-01275Js and two F-12105Bs; see Figure 1 and 2. Cut the F-01275J from .063 thick Buna-N 70A rubber sheet and cut the F-12105B from .094 Buna-N 70A rubber sheet. The holes in the F-12105B can be drilled and do not have to be exactly to size. A drill bit larger than the hole size shown on the template will need to be used to compensate for stretching of the rubber while drilling.

Step 2: Machine countersink the nutplate attach rivet holes in the F-12105A, then attach the nutplates shown in Figure 2. Repeat for the second F-12105A placing the nutplates on the opposite side.

Step 3: Use fuel tank sealant to bond the F-01275J to the F-01275H-L to produce the Bottom Left Main Gear Seal Assembly as shown in Figure 1. Scuff mating surfaces prior to bonding and clamp the parts while curing.

Bond the F-12105B to the F-12105A to produce the Top Left Main Gear Assembly as shown in Figure 2.

Repeat this step using the remaining parts to produce the mirrored Top and Bottom Right Main Gear Seal Assemblies.

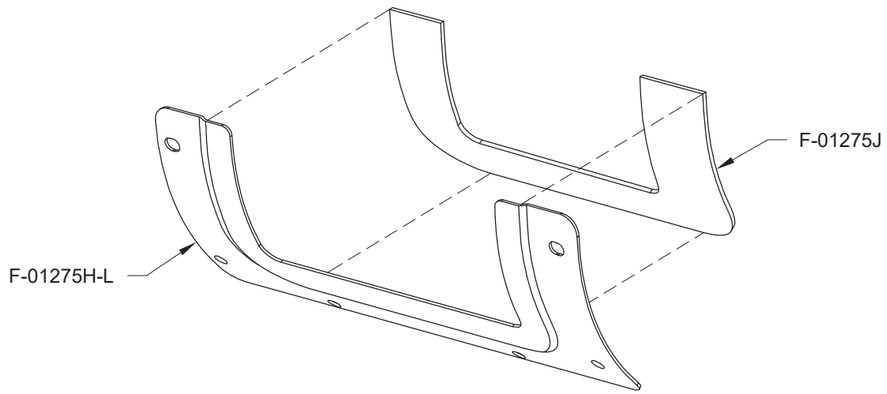


FIGURE 1: BOTTOM LEFT MAIN GEAR SEAL ASSEMBLY

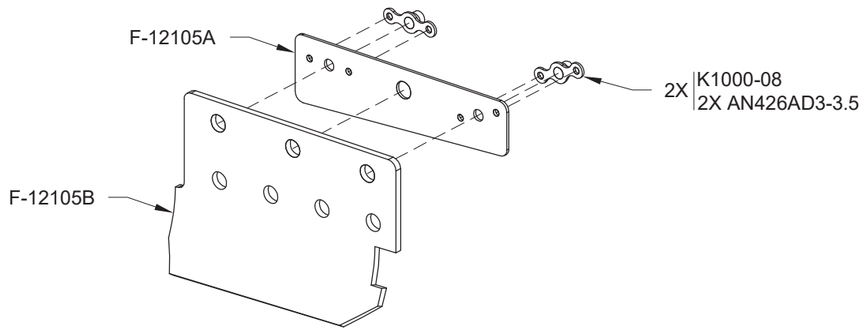


FIGURE 2: TOP LEFT MAIN GEAR SEAL ASSEMBLY

Step 4: Slide the Top Main Gear Seal Assemblies behind the F-01270A-1 and F-01270-L-1 & -R-1 and secure them in place using the hardware called out in Figure 3.

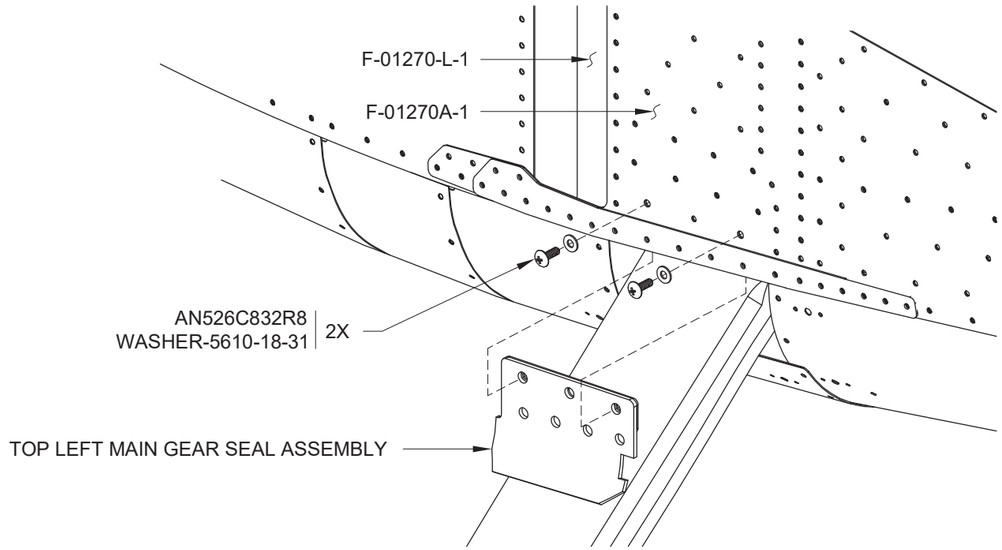


FIGURE 3: ATTACHING THE TOP MAIN GEAR SEAL ASSEMBLIES

Step 5: Attach the Bottom Main Gear Seal Assemblies using the hardware called out in Figure 4. Make a small cut-out in the rubber for the brake lines. Position the tab on the Top Main Gear Seal Assemblies outboard of the Bottom Main Gear Seal Assemblies.

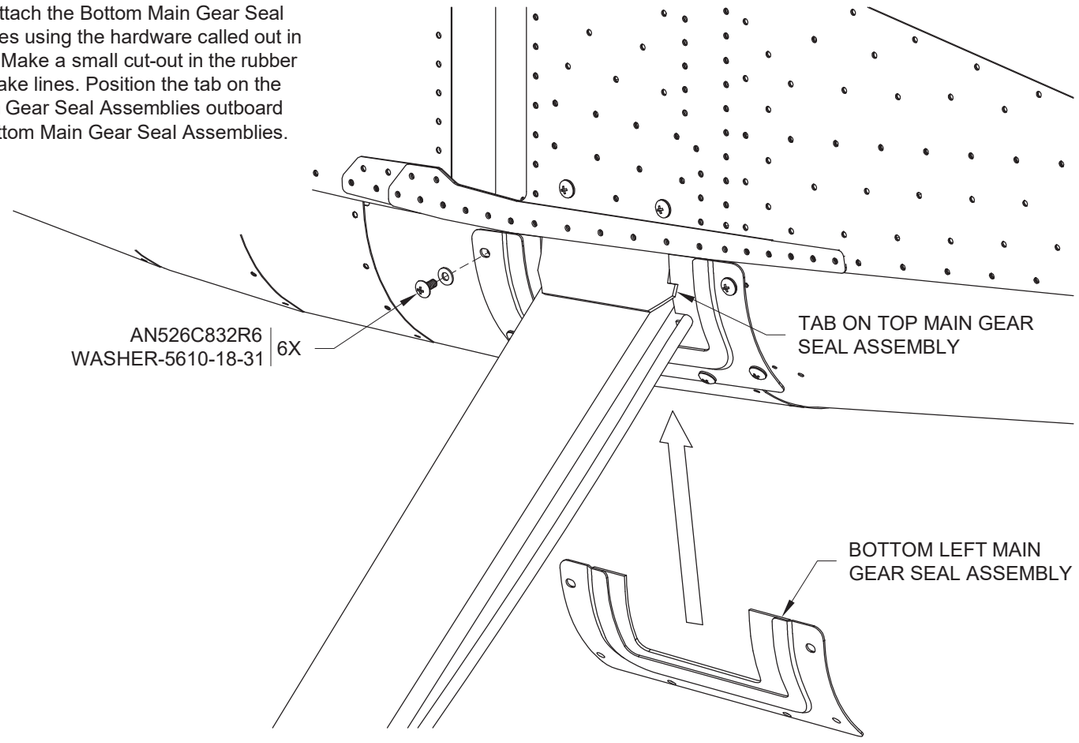


FIGURE 4: ATTACHING THE BOTTOM MAIN GEAR SEAL ASSEMBLIES

NOTE: Review Section 5.19 before proceeding.

Step 1: Remove both wings if installed.

Step 2: Cleco on the T-01231 as shown on Page 38iS/U-18, Figure 2, and trace the outer circumference of the flange onto the F-01277-R-1 Fwd Turtle Deck Skin. Remove the T-01231.

Step 3: Position the F-1277B Aft Window on the fuselage as shown in Figure 1.

Slide the window underneath the turtle deck skins and aft against the F-1232B-L & -R.

Step 4: Adjust the lateral (left/right) position of the window as required to obtain the most consistent overlap between the aft edge of the window and the forward edge of the turtle deck skins.

Step 5: Push the lower forward edges of the window aft in order to force the window outward against the turtle deck skins and to reduce any gaps.

Step 6: Securely clamp the window to the roll bar with spring clamps.

Place additional spring clamps along the roll bar so that the "nose" of each clamp butts against the forward edge of the window; this will prevent the window from shifting forward.

Step 7: Mark the inside of the window where it contacts the F-1232B-L & -R with a permanent marker. Material will be removed from the window to accommodate the F-1232B-L & -R.

Step 8: Examine the entire roll bar and record the shortest distance between the forward edge of the window and the aft edge of the F-1231A-FL & -FR Roll Bar Frames. Also see Page 38iS/U-13, Figure 2.

Step 9: Remove the window.

NOTE: As supplied, the window is protected by plastic film. To maintain this protection during the construction process, leave most of the plastic film in place until the aircraft is nearly ready to fly.

Step 10: Peel back and trim the protective plastic on the inside and outside of the window to approximately 1 in. [25.4 mm] from the edge of the window.

NOTE: To prevent cracking, each window attach hole must have at least 5/16 in. [7.9 mm] of edge distance.

Step 11: Remove material from the window to accommodate the F-1232B-L & -R using the length determined in Step 8 plus 1/32 [0.8 mm].

Step 12: Repeat Steps 3 through 6 to verify proper fit. The window must not contact the F-1232B-L & -R.

Step 13: Round any sharp corners within the modified areas.

Step 14: Repeat Steps 3 through 6.

NOTE: The adhesive used on some brands of electrical tape may be incompatible with the window. Test the tape on a scrap of material before use. In all cases, do not leave the tape on the window for extended periods of time (more than two days).

Step 15: Apply a length of quality tape (masking or electrical) to the outside of the window with the aft edge of the tape offset 1/16 in. [1.6 mm] from the upper/forward edge of the turtle deck skins.

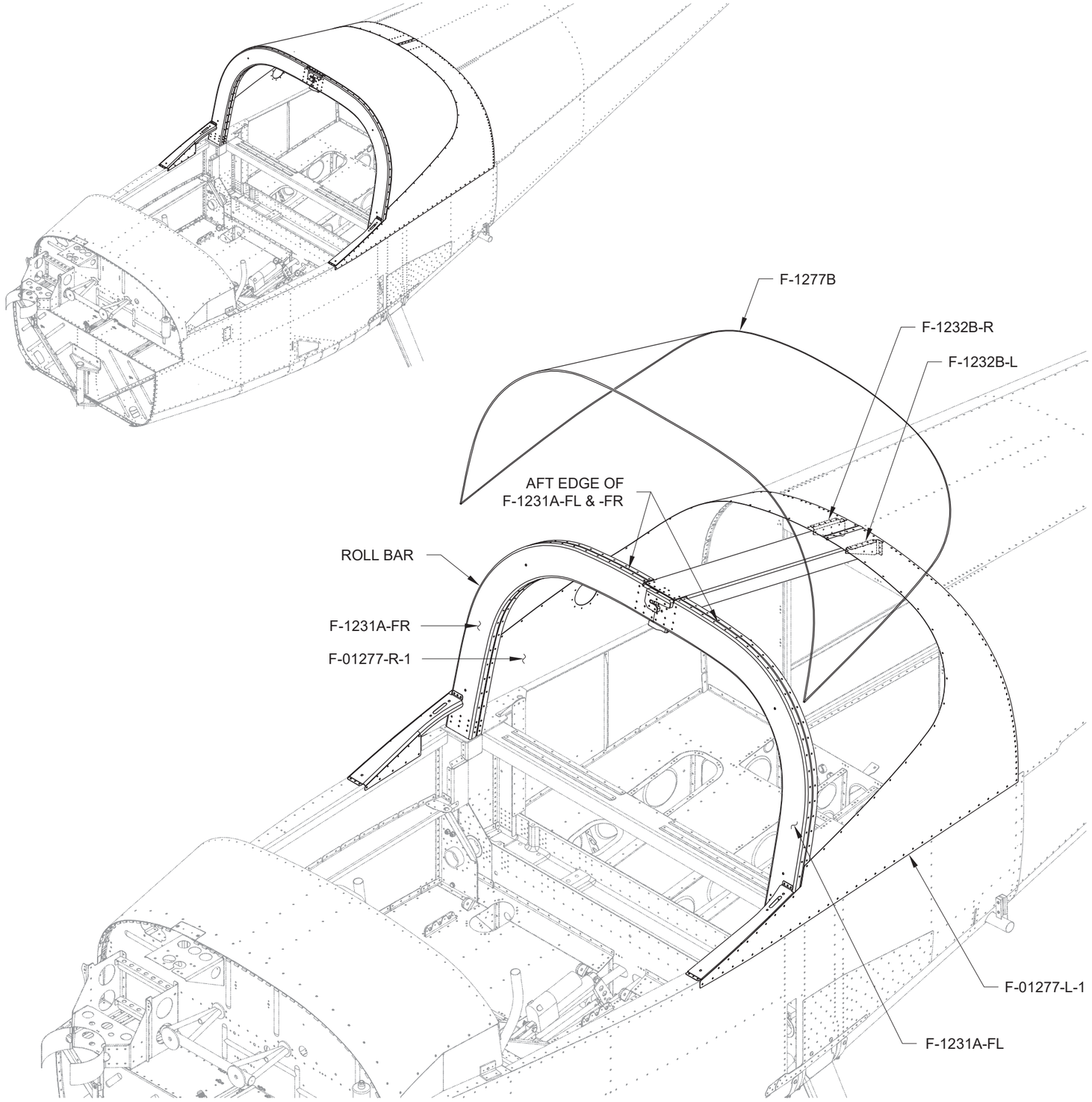


FIGURE 1: AFT WINDOW FIT

NOTE: When drilling the window, be aware of visual distortion due to paralax. Aways drill perpendicular to the surface of the window. After drilling each hole, remove any drilling debris that becomes trapped between the parts being drilled.

NOTE: Have a helper position a wood back-up block underneath each hole as it is match-drilled. This will help to keep the window tight against the skins, prevent chipping around the drill exit hole, and greatly reduce the risk of cracks.

Step 1: Drill and match-drill the F-1277B Aft Window and associated structure as follows:

Drill the groups of holes in the order shown in Figure 1 (1 through 11). Start on the left side at the inboard-most hole in each group and then drill its mirror on the right side. Proceed symmetrically and outboard one hole at a time. Cleco each hole as it is drilled. Verify proper window fit after drilling each hole.

(a) Except for the hole in group 11, match-drill #30 the holes in the F-01277-L-1 & -R-1 Fwd Turtle Deck Skins into the window.

(b) Drill #40 the window and F-1231A-AL & -AR Roll Bar Frames. Evenly space each hole midway between the rivets in the roll bar.

(c) Match-Drill #40 the hole of group 11 into the left and right side of the window and roll bar.

Step 2: Final-Drill #36 and tap 6-32 all of the holes common to the F-1231A-AL & -AR Roll Bar Frames and window. Both the roll bar frames and the window are tapped. Use the drilling order/method described in the previous step ("3", "5", "7", "9", and "11") .

Install a screw in each hole as it is tapped. Use low torque to minimize stress on the window. See the hardware called out in Figure 2 on the next page.

Step 3: Remove every other screw from the F-1231A-AL & -AR Roll Bar Frames.

Step 4: Apply a length of quality tape (masking or electrical) to the outside of the window with the forward edge of the tape aligned with the aft edge of the F-1231A-FL & -FR Roll Bar Frames. Create a cutout in the tape for each screw head; see Figure 2.

This tape marks the final trim line at the forward edge of the window.

Step 5: Copy the trace made for the T-01231 on Page 38iS/U-12, Step 2 onto the window.

Step 6: Remove the window.

Step 7: Final-Drill #27 all of the holes in the window. Position a wood back-up block underneath each hole as it is drilled.

Step 8: Trim the forward edge of the window up to the line of tape that was applied in Step 4. Remove the tape.

Step 9: Chamfer the top and bottom edges of the window as shown in the detail view of Figure 1.

Step 10: Trim the window 1/32 [.8 mm] beyond the trace made in Step 5.

Step 11: Use fine-grit sandpaper to remove all visible scratches from the trimmed and chamfered edges of the window.

Step 12: Break the edges of the turtle deck skins inward so that they will fit tightly against the window.

Step 13: Final-Drill #27 the window attach holes in the turtle deck skins and deburr.

NOTE: Now is a good time to paint the aircraft interior if/as desired.

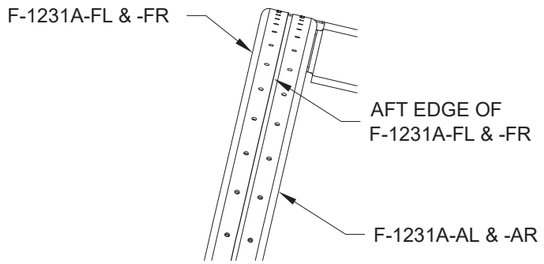


FIGURE 2:
AFT EDGE OF FWD ROLL BAR FRAMES

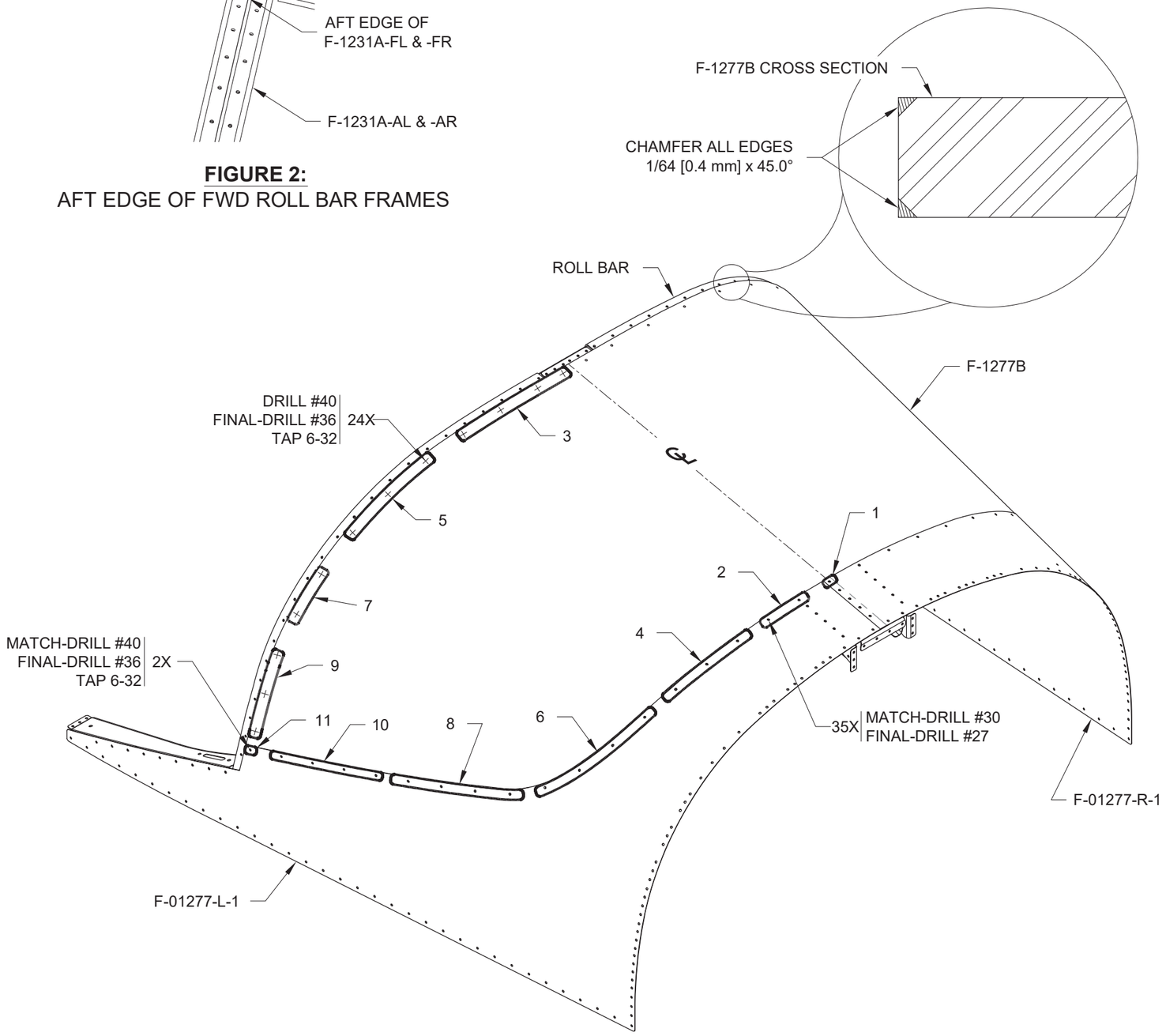


FIGURE 1: DRILLING THE WINDOW

NOTE: For better access to the fuselage during construction and to protect the window, final installation of the window (as described on this page) can be delayed until the aircraft is nearly ready to fly.

Step 1: Install the F-1277B Aft Window on the fuselage using the hardware shown in Figure 2 and Figure 3. Use low torque (approximately 2 in-lbs) to minimize stress on the window. Leave the screws/nuts common to the window and the F-01277-L-1 & -R-1 Fwd Turtle Deck Skins loose for now.

Step 2: Apply a length of tape (masking or electrical) to the outside of the turtle deck skins with the edge of the tape aligned with the edge of the skins. Curl the tape up locally for access to each screw head; see Detail A in Figure 1.

Step 3: Apply a length of tape to the inside of the turtle deck skins with the edge of the tape aligned with the aft edge of the window; see Detail B in Figure 1.

Step 4: Apply a length of tape to the outside of the window with the aft edge of the tape offset 1/16 in. [1.6 mm] from the edge of the skins; see Detail A in Figure 1.

Step 5: Cover the fuselage skin, window, and baggage area as required for easier cleanup after applying sealant to the window.

Step 6: Fabricate a popsicle stick tool as shown in Figure 4.

NOTE: The remaining steps on this page must be completed in a single work session.

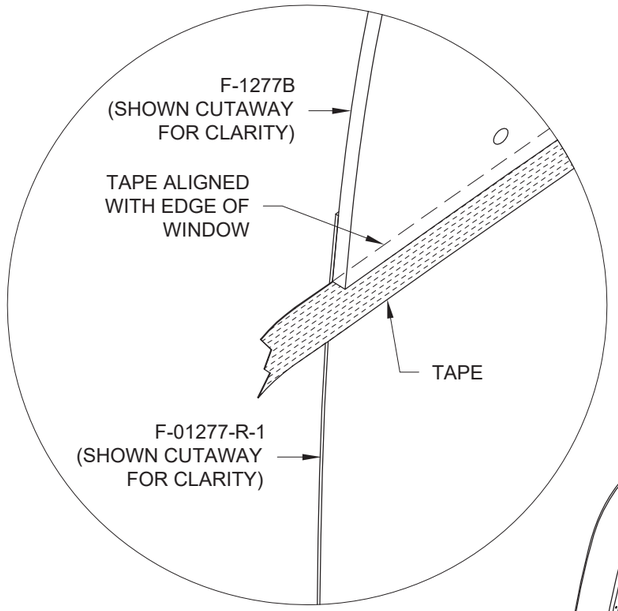
Step 7: Put fuel tank sealant into a heavy-gauge plastic bag. Cut a corner off of the bag to create a Ø3/32 in. [Ø2.4 mm] hole. Apply the sealant by squeezing the mixture through the hole (the way a cake decorator would put frosting on a cake).

Step 8: Press inward on the window to create a gap between the window and the turtle deck skins. Apply a 1/8 in. [3.2 mm] bead of sealant between the window and the skins. The edge of the popsicle stick tool can be used as a spacer to keep the window and skins apart.

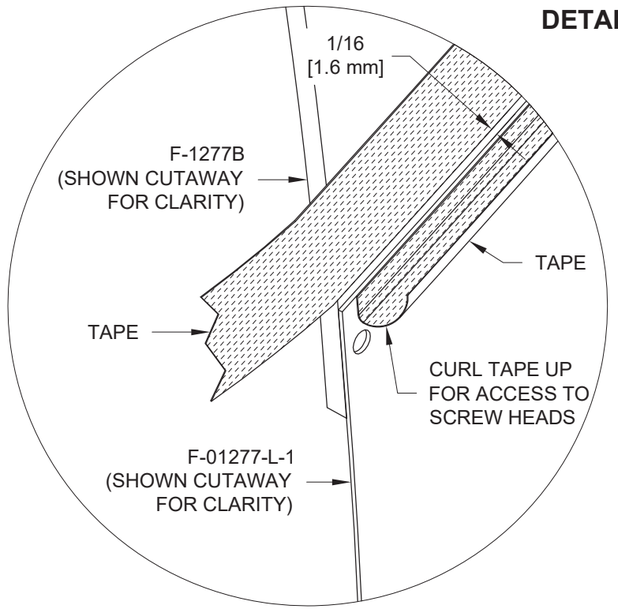
Step 9: Tighten the remaining window attach hardware. Use low torque (approximately 2 in-lbs) to minimize stress on the window.

Step 10: Use the radiused corner of the popsicle stick tool to create a fillet in the sealant that extrudes out between the window and the turtle deck skins.

When satisfied with the appearance, allow the sealant to partially cure, then remove all of the tape to leave a crisp edge.



DETAIL B



DETAIL A

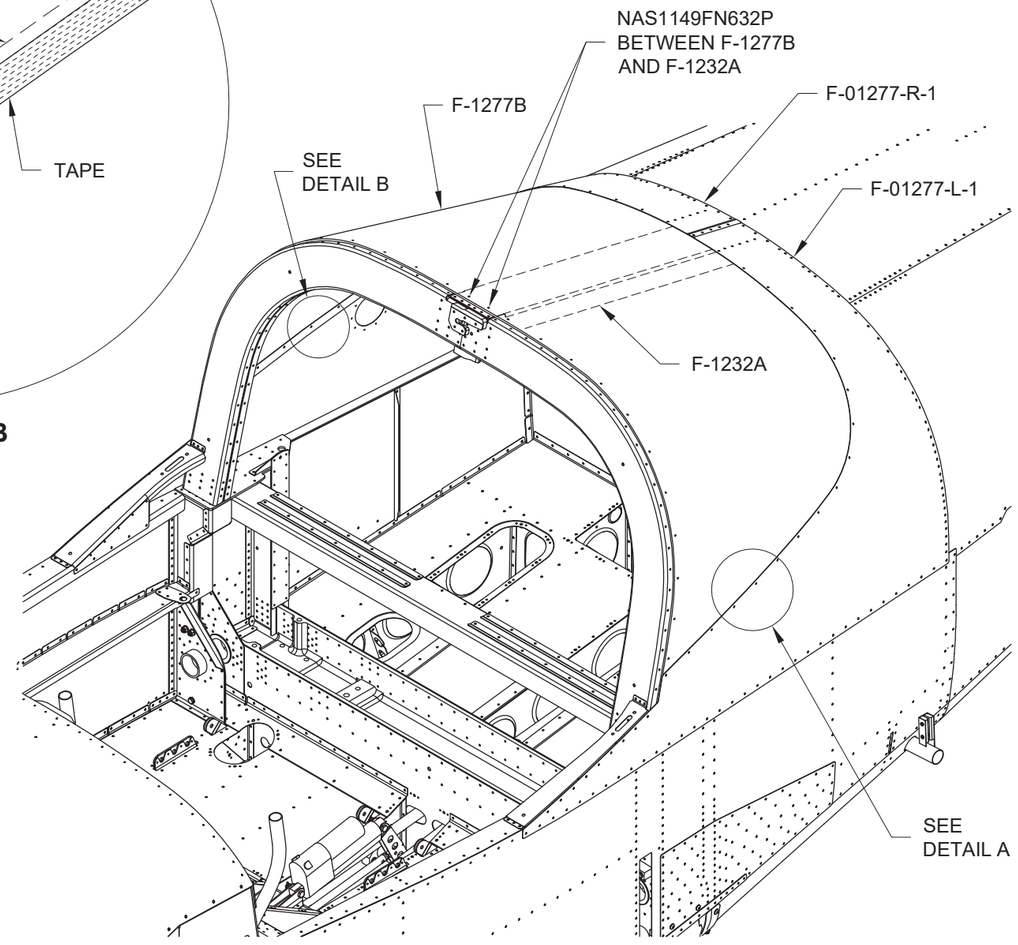


FIGURE 1: AFT WINDOW FINAL INSTALLATION

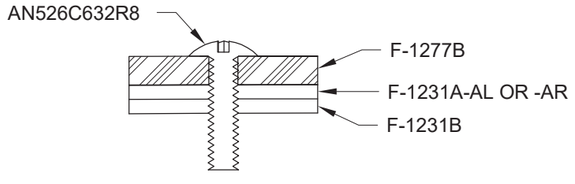


FIGURE 2: WINDOW TO ROLL BAR

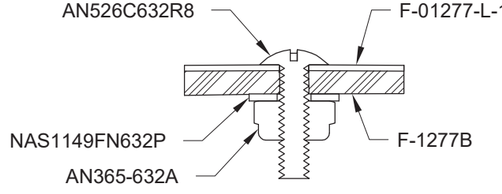


FIGURE 3: WINDOW TO SKIN

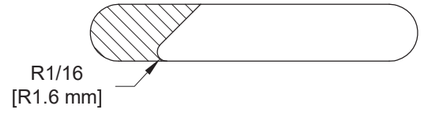


FIGURE 4: POPSICLE STICK TOOL

NOTE: Before proceeding with this section, attach the vertical stabilizer, rudder, and stabilator to the tailcone, then return to Page 12-05, Step 1 and complete the remainder of Section 12. Leave the empennage attached when Section 12 is completed.

Step 1: Separate the F-01258-1 into individual parts by removing the hatched areas shown in Figure 1.

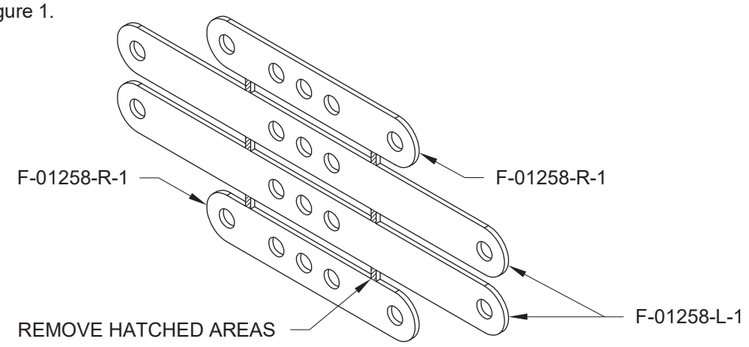


FIGURE 1: SEPARATING THE F-01258-1 RUDDER CABLE LINKS

Step 2: Use the string that was routed through the tailcone in Section 10 to pull the F-01239-1 Rudder Cables through the snap bushing in both F-1238 Snap Bushing Brackets and out the F-1211 Bulkhead; see Section 10.

NOTE: See "Fasteners As Pivot Points" in Section 5.20 for information on cable end attachment hardware.

Step 3: Secure the rudder cables to the WD-1205 using the hardware called out in Figure 2.

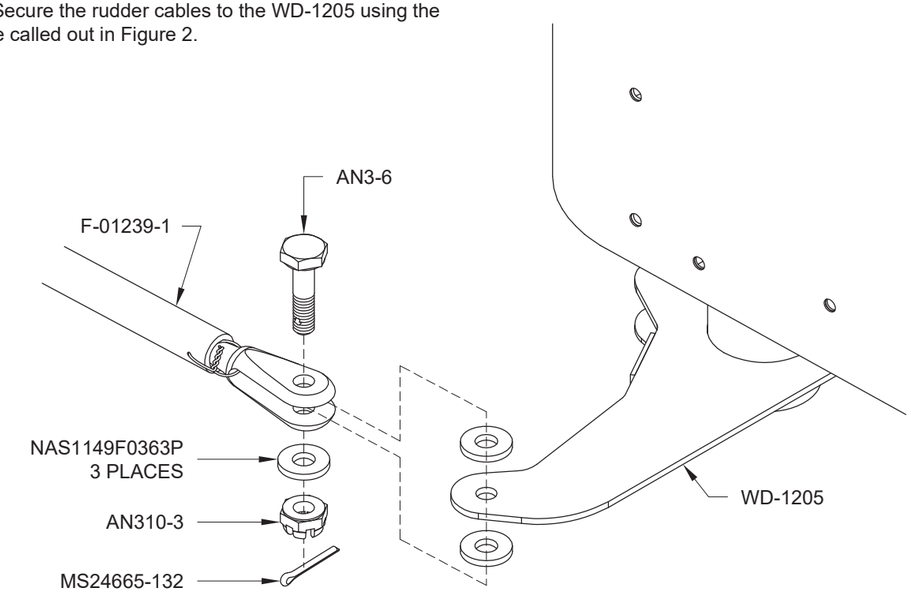


FIGURE 2: SECURING THE RUDDER CABLES TO THE RUDDER HORN

Step 4: Center the rudder. This can be verified by measuring the distances from the trailing edge of the vertical stabilizer skin to the line of rivets on the rudder shown in Figure 3. When this distance is the same for the left and right side, restrain the rudder by applying duct tape (masking tape if painted) across the gap between the vertical stabilizer and rudder as shown. Verify that the rudder has not moved while applying the tape.

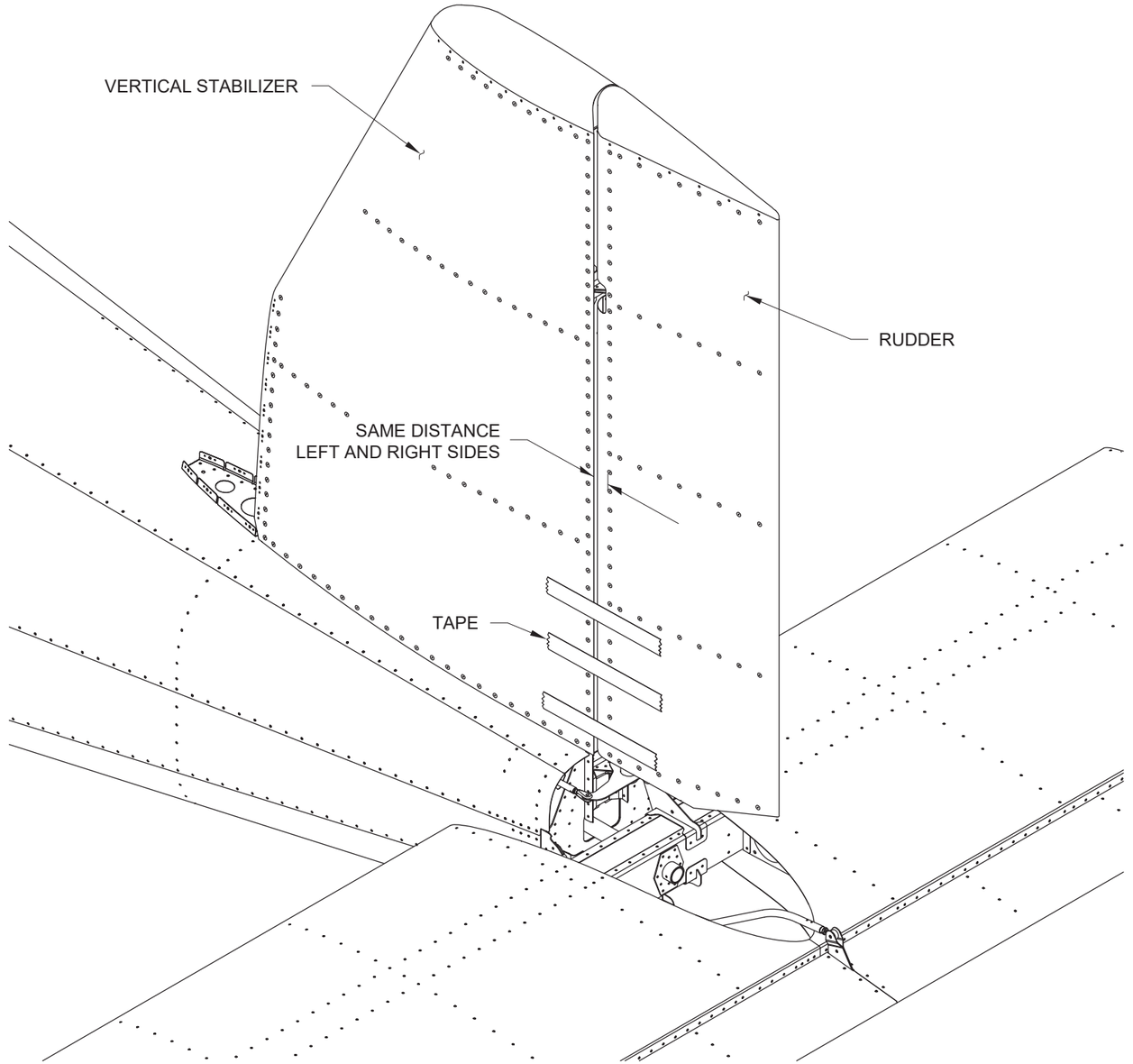


FIGURE 3: CENTERING THE RUDDER

Step 1: Cut two spacers from a 2X4 (or equivalent) to the dimension shown in Figure 1.

Place the spacers between the firewall and the horizontal tubes at the bottom of the WD-01206-1. Only two spacers on either the pilot or passenger side are required, and be sure to avoid the nuts securing the F-1290s.

Step 2: Temporarily attach the forward ends of the F-01239-1 Rudder Cables to one set of the F-01258-L-1 & -R-1 Rudder Cable Links as shown in Figure 1.

Step 3: Hold the horizontal tube at the bottom of the WD-01206-1 against the left spacer (a second person is helpful here, or use a prop between the F-1290 and F-01202F-1 Bulkhead). Pull the left rudder cable tight and insert a bolt into one of the three middle holes in the rudder cable link that best aligns with the hole in the arm of the WD-01206-1. Since the holes at the ends of the link are at slightly different distances from middle three holes, a possible finer adjustment can be made by removing the link from the rudder cable, reattaching using the hole in the other end of the link, and reinserting the bolt into the link and WD-01206-1 arm.

The correct set of bolt holes is the one that places the horizontal tube of the WD-01206-1 as close as possible to the spacers without the rudder cable going slack.

Mark the link for the two bolt holes that will be used.

Step 4: Repeat Step 3 for the right link.

Step 5: Trim the links as shown in Figure 2, then prime and paint.

WARNING: When the bolts are installed in the next step, it is vital that they are oriented as shown in Figure 3; with the heads on the outboard side of the rudder cable links.

NOTE: See "Fasteners As Pivot Points" in Section 5.20 for information on cable end attachment hardware.

Step 6: Attach the links to the rudder cables as shown in Figure 3. Rotate the arms of the WD-01206-1 so that the hole in the arms aligns with the bolt insertion hole in the F-01217-L & -R (see Figure 1), then attach the links to the arms.

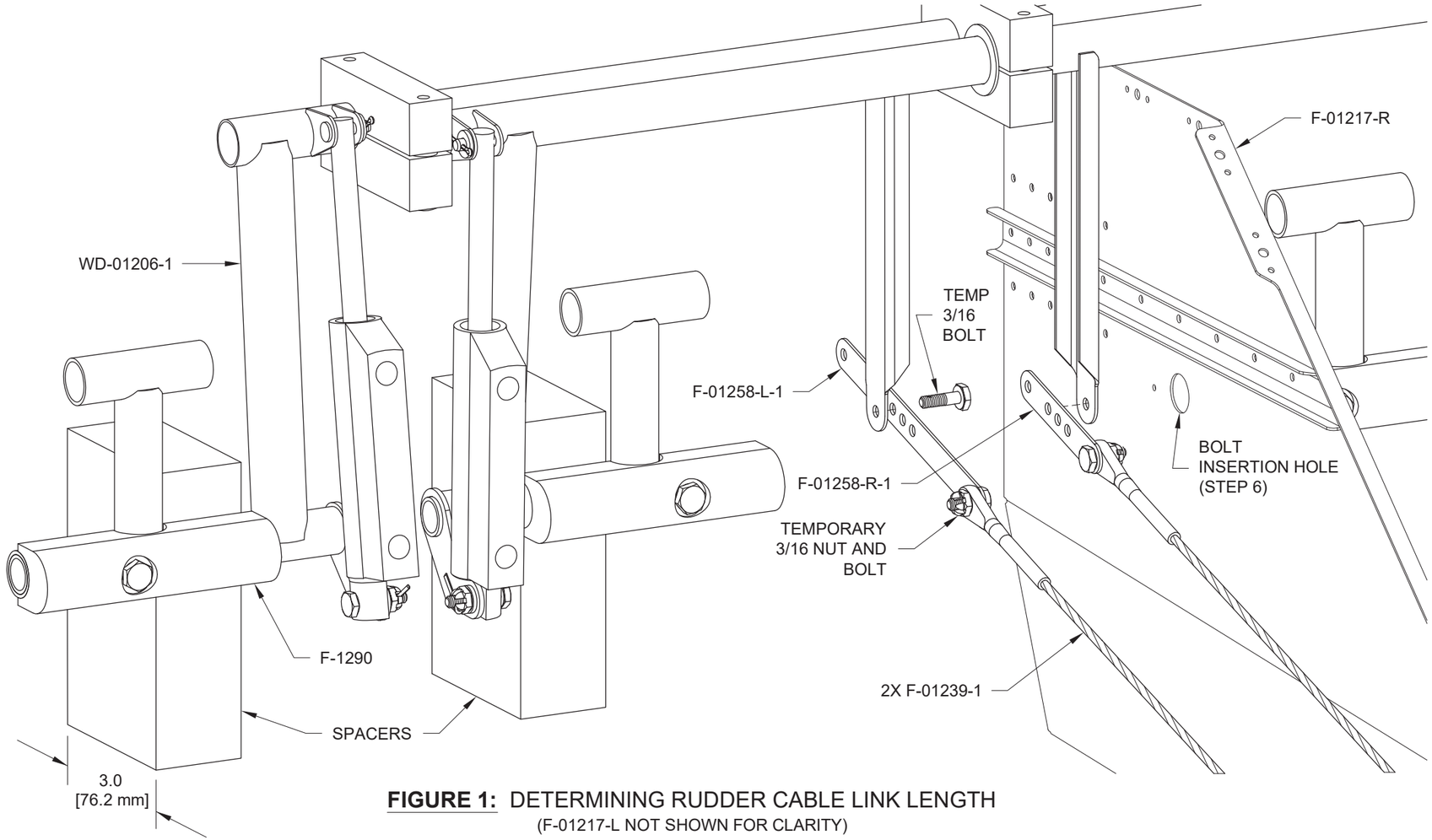


FIGURE 1: DETERMINING RUDDER CABLE LINK LENGTH
(F-01217-L NOT SHOWN FOR CLARITY)

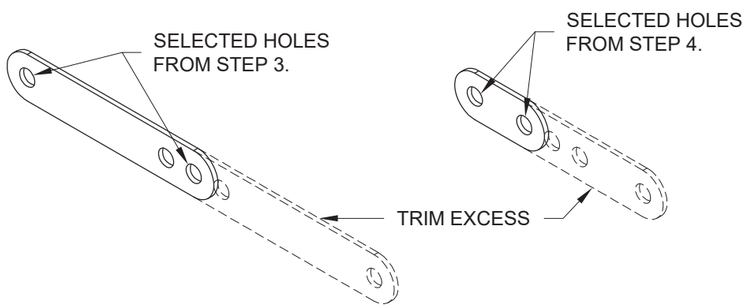


FIGURE 2: TRIMMING THE RUDDER PEDAL LINKS

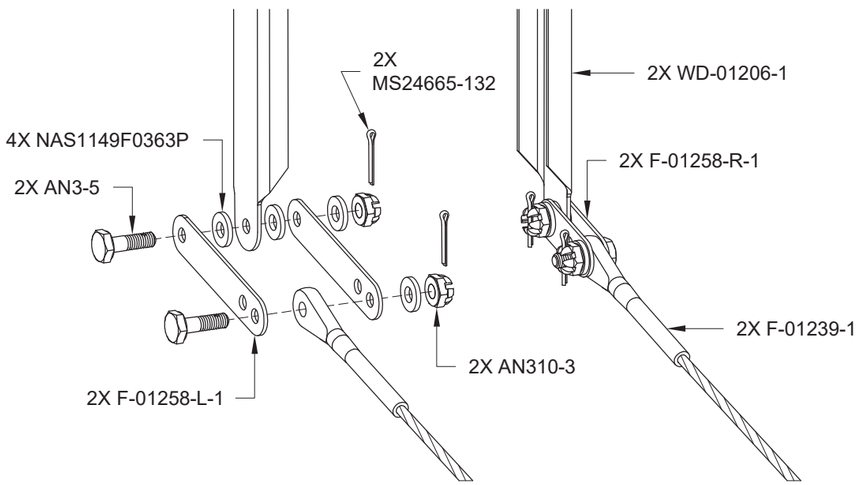


FIGURE 3: ATTACHING THE RUDDER CABLES

NOTE: See "Fasteners As Pivot Points" in Section 5.20 for information on cable end attachment hardware.

Step 1: Use the string that was routed through the tailcone in Section 10 to pull the F-01247D & F Aft Stabilator Cables through the holes in the F-1211 Bulkhead.

Secure the ends of the stabilator cables to the WD-01207-1 and WD-01208-1 Stabilator Horns using the hardware called out in Figure 1.

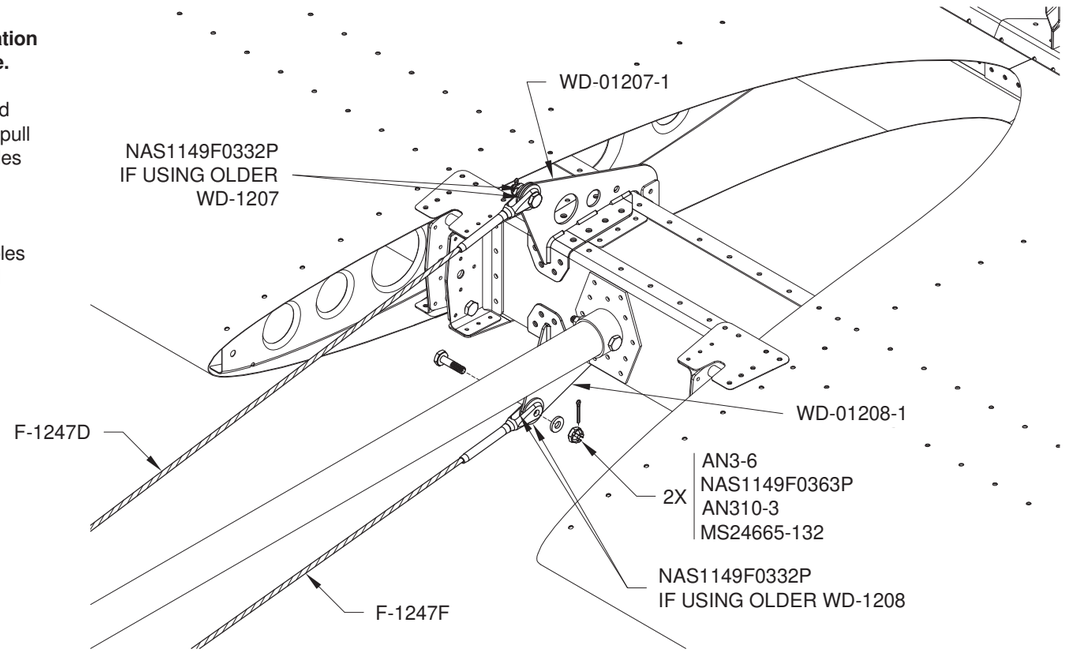


FIGURE 1: CONNECTING THE STABILATOR CABLES

NOTE: A cable tension meter is required to accurately set the cable tension.

Step 2: Connect the ends of the F-01247C & E Forward Stabilator Cables that were stowed in Section 32iS/U to the F-01247D & F Aft Stabilator Cables as shown in Figures 2 and 3. A wire tool can be made that is inserted into the holes in the cable ends; this will hold them stationary as the barrel is rotated.

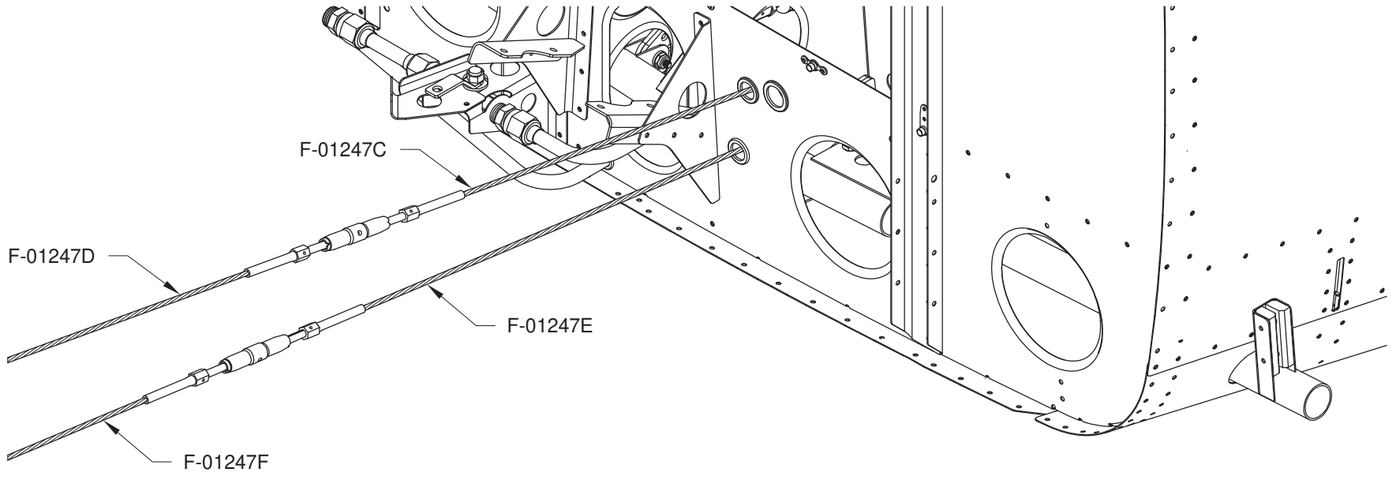


FIGURE 2: STABILATOR CABLES

Step 3: Place a small weight on the stabilator to hold it trailing edge down.

Step 4: Adjust the length of the upper cable by rotating the barrel of the upper turnbuckle until the control stick is just clear of its forward stop.

Remove the slack from the lower cable by adjusting the lower turnbuckle. Check the entire length of the cables to ensure they are free from interference, are properly aligned in the pulleys, and do not touch each other. Pull the stick aft to make sure that the stabilator trailing edge moves up.

Step 5: Remove the weight from the stabilator.

NOTE: Cable tension will change significantly with changing temperature. The cable tensions given below are for an ambient temperature of 70 °F [21 °C].

Step 6: Position one of the WD-1212 Control Sticks so that the forward side of the top end is 10 in. [25.4 cm] from the aft flange of the F-01202B-1; see Page 29iS/U-08, Figure 1. Secure the control stick in this position by clamping it to a 41 in. [104 cm] long stick that is bridged between, and clamped to, the longerons.

With the control stick correctly positioned, check the cable tension aft of the F-01207B-1 Baggage Bulkhead using a calibrated cable tension meter .

Adjust both turnbuckles an equal number of turns to achieve 35-45 lbs of tension with the groove in the cable ends aligned with a V-notch in the turnbuckle barrels as shown on Page 38iS/U-18, Figure 1. This tension will prevent the cables from "slapping" against the tailcone bulkheads when the control sticks are moved suddenly and repeatedly forward then aft.

Step 7: Remove the stick that is restraining the control stick.

Move the control stick between the forward and aft pitch stops. The stabilator should reach its travel stops just before the corresponding control stick stops are reached. If not, adjust the turnbuckles an equal and opposite number of turns until this is achieved. (Example: If the stabilator reaches its T.E. up stop too soon, loosen the upper turnbuckle and tighten the lower turnbuckle. This will lengthen the upper cable and shorten the lower cable). After making adjustments, repeat Step 6 to reconfirm proper cable tension.

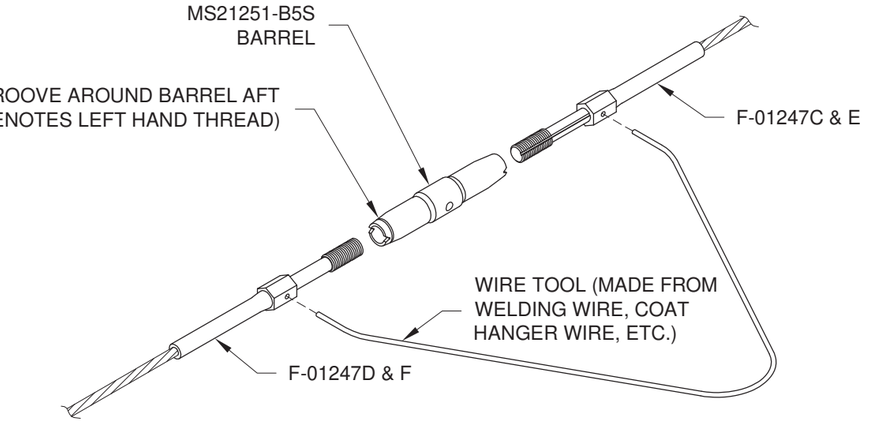


FIGURE 3: CONNECTING THE STABILATOR CABLES

Step 1: Once the proper tension is achieved, and no more than three threads are exposed from the ends of the barrels, align the V-notch in the ends of the barrel with the groove in the cable ends and then insert the lock clips as shown in Figure 1. The hook end of the lock clips are inserted into the hole in the center of the barrel and must be completely pressed in until the hook springs open inside the barrel.

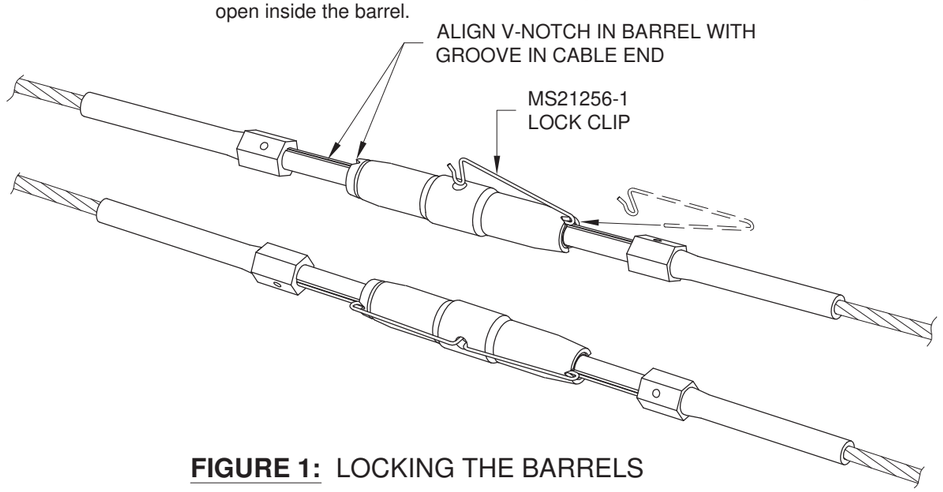


FIGURE 1: LOCKING THE BARRELS

Step 2: Temporarily install the fuel tank as described on Page 26iS/U-08.

Step 3: Apply fuel tank sealant to the mating flange of the T-01231, then rivet it to the F-01277-R-1 using the rivets called out in Figure 2. When properly oriented, the outlet of the T-01231 will be directed toward the T-01229 on the fuel tank.

Step 4: Insert the T-00007A Fuel Cap into the T-01231. If the cap does not quite fit, lightly sand the outside perimeter of the cap and/or the inside of the T-01231.

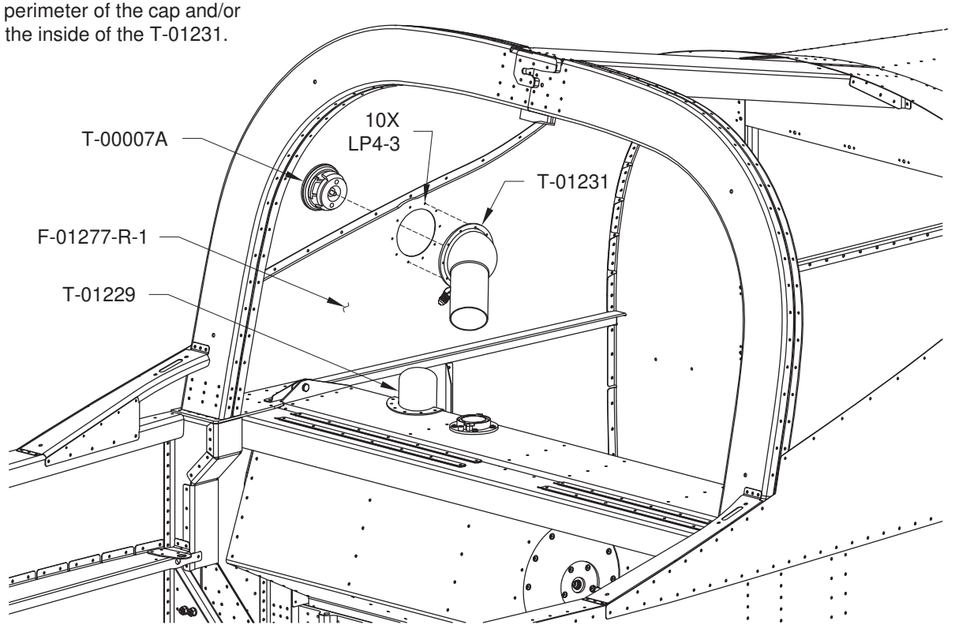


FIGURE 2: INSTALLING THE FILLER NECK

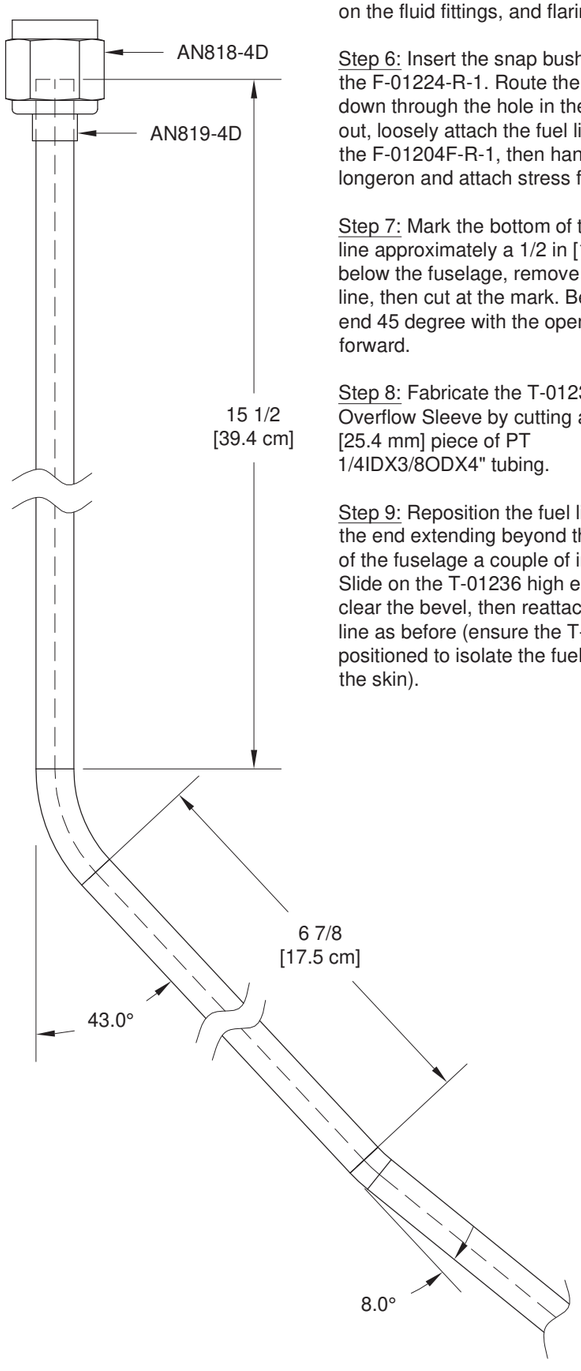


FIGURE 3: T-01235 OVERFLOW FUEL LINE

NOTE: See Section 5.14 for important information on the process to fabricate fluid lines.

Step 5: Straighten 28 in. [71.12 cm] of ATO-035X1/4 tubing by unrolling it against a table top. Fabricate the T-01235 Overflow Fuel Line by making the two bends shown in Figure 3, sliding on the fluid fittings, and flaring the end of the tube.

Step 6: Insert the snap bushing called out in Figure 4 into the hole in the F-01224-R-1. Route the fuel line through the snap bushing and down through the hole in the F-01273-R-1. Using the hardware called out, loosely attach the fuel line to the nutplate on the forward side of the F-01204F-R-1, then hand bend the fuel line as required to clear the longeron and attach stress free to the fluid fitting on the T-01231.

Step 7: Mark the bottom of the fuel line approximately a 1/2 in [12.7 mm] below the fuselage, remove the fuel line, then cut at the mark. Bevel the end 45 degree with the open face forward.

Step 8: Fabricate the T-01236 Fuel Overflow Sleeve by cutting a 1 in. [25.4 mm] piece of PT 1/4IDX3/8ODX4" tubing.

Step 9: Reposition the fuel line with the end extending beyond the bottom of the fuselage a couple of inches. Slide on the T-01236 high enough to clear the bevel, then reattach the fuel line as before (ensure the T-01236 is positioned to isolate the fuel line from the skin).

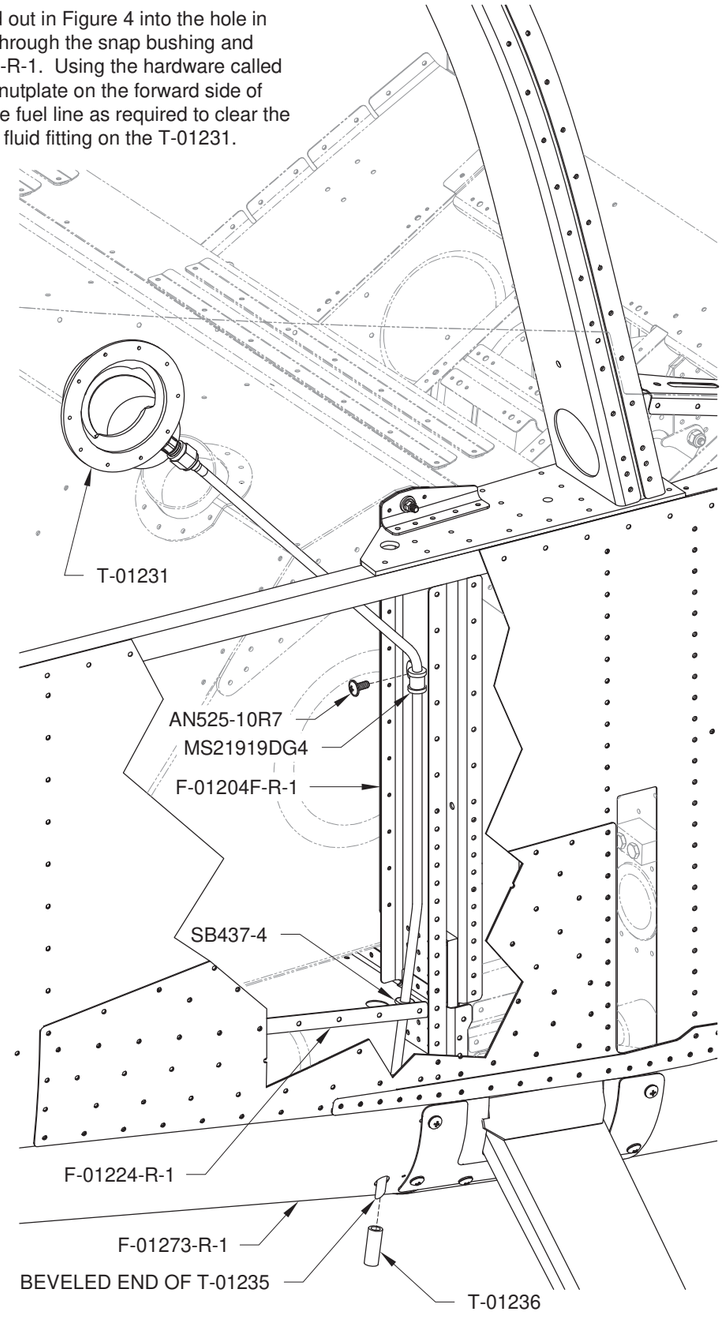


FIGURE 4: OVERFLOW FUEL LINE

Step 1: The T-01234 Fuel Filler Hose is slightly curved. Remove the curve by heating the hose and bending until roughly straight.

Step 2: Attach the hose to the T-01229 and T-01231 using the hose clamps called out in Figure 1.

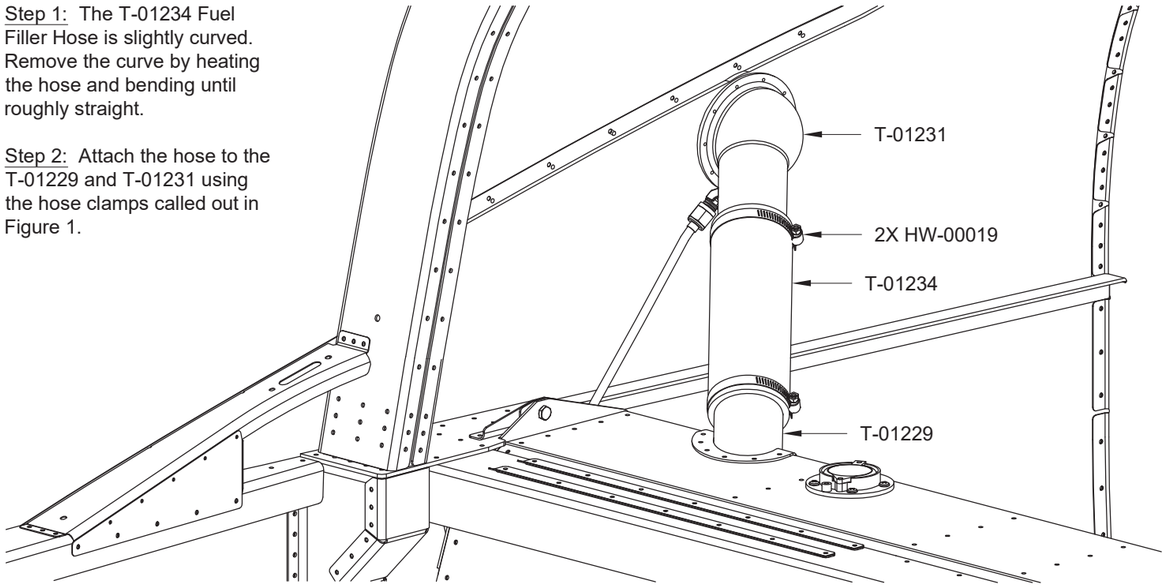


FIGURE 1: ATTACHING THE FUEL FILLER HOSE

Step 3: Attach the end fitting of the crotch straps to the F-01267A-1 & B-1 using the hardware called out in Figure 2.

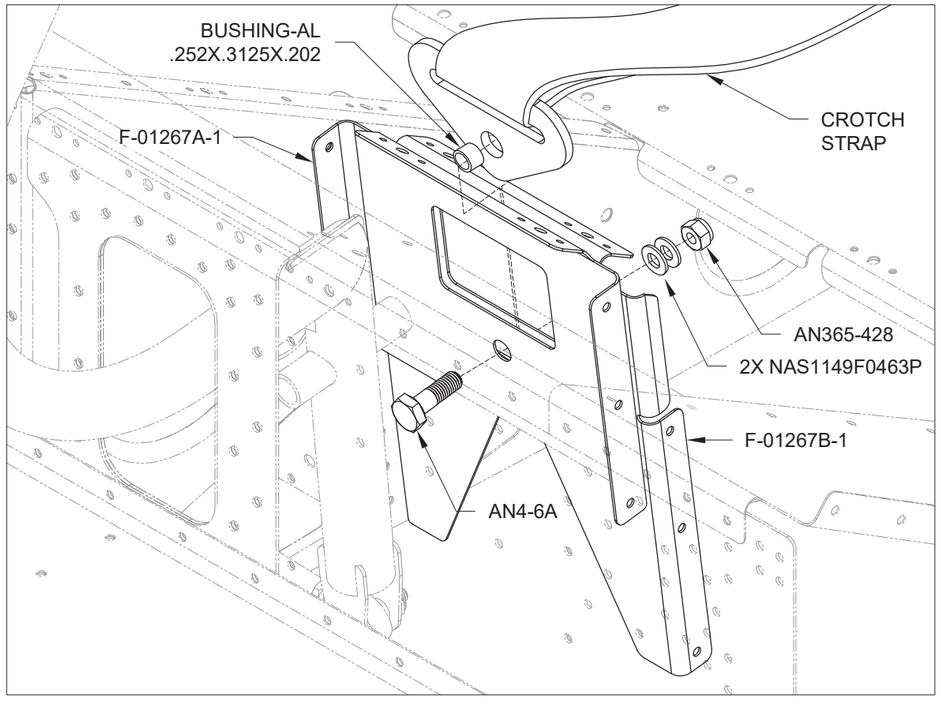


FIGURE 2: CROTCH STRAP INSTALLATION

NOTE: Two opposite lap belt sections (one male and one female) should be mounted at the center lug locations to prevent the belts from being used in the incorrect seat position.

Step 4: Attach the end fitting of the lap belts to the F-01299 using the hardware shown in Figure 3. Take care when installing the lap belts that they will not be twisted when buckled together.

NOTE: The installation of all access covers can be delayed to any point in the remainder of the build process.

Step 5: Attach the F-01227-1, F-01228-1, and F-01276B-1 covers shown in Figure 3.

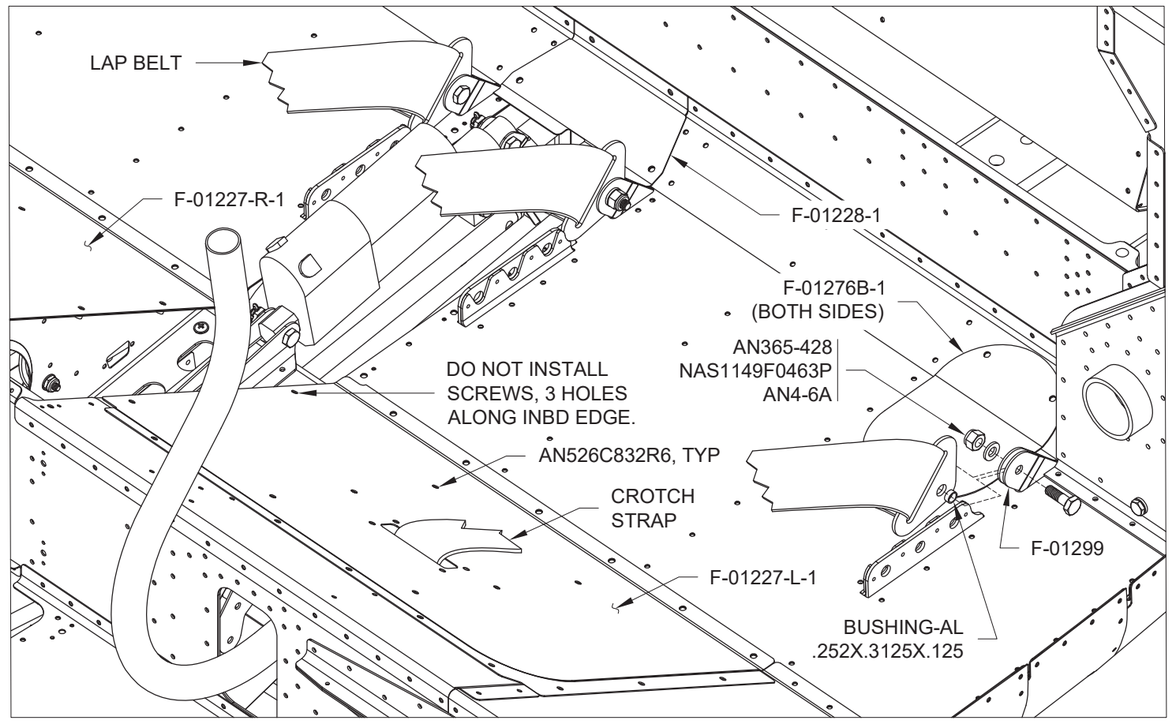


FIGURE 3: LAP BELT AND COVER INSTALLATION

Step 1: Attach one end of the F-12114 Shoulder Harness Cables to the F-1207E Shoulder Strap Lug using the hardware called out in Figure 1. No bushings are needed at this end.

Step 2: Attach the other end of the F-12114 Shoulder Harness Cables to the shoulder harness as shown in Figure 1. Take care when installing the shoulder harnesses that they will not be twisted when buckled.

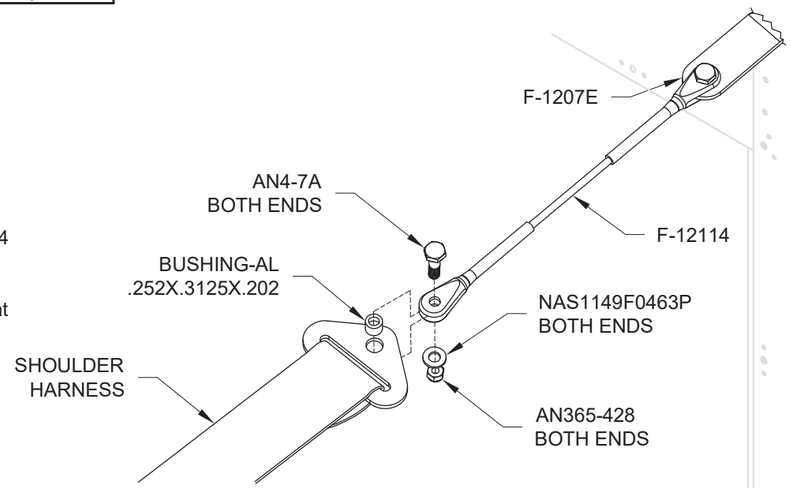


FIGURE 1: SHOULDER HARNESS ATTACH

NOTE: Optional "bullet" step plugs are available to install in the open ends of the WD-1233-1 Steps. Order 12 STEP PLUG KIT WHITE or 12 STEP PLUG KIT BLACK from Van's Aircraft.

Step 3: Bolt the WD-1233-1 Steps to the F-01202F-1 and underlying F-01236A-1 & B-1 as shown in Figure 2.

Step 4: Seal the gap between the fuselage and the steps with fuel tank sealant; see Figure 2.

Step 5: Attach the F-12104 to both sides of the fuselage.

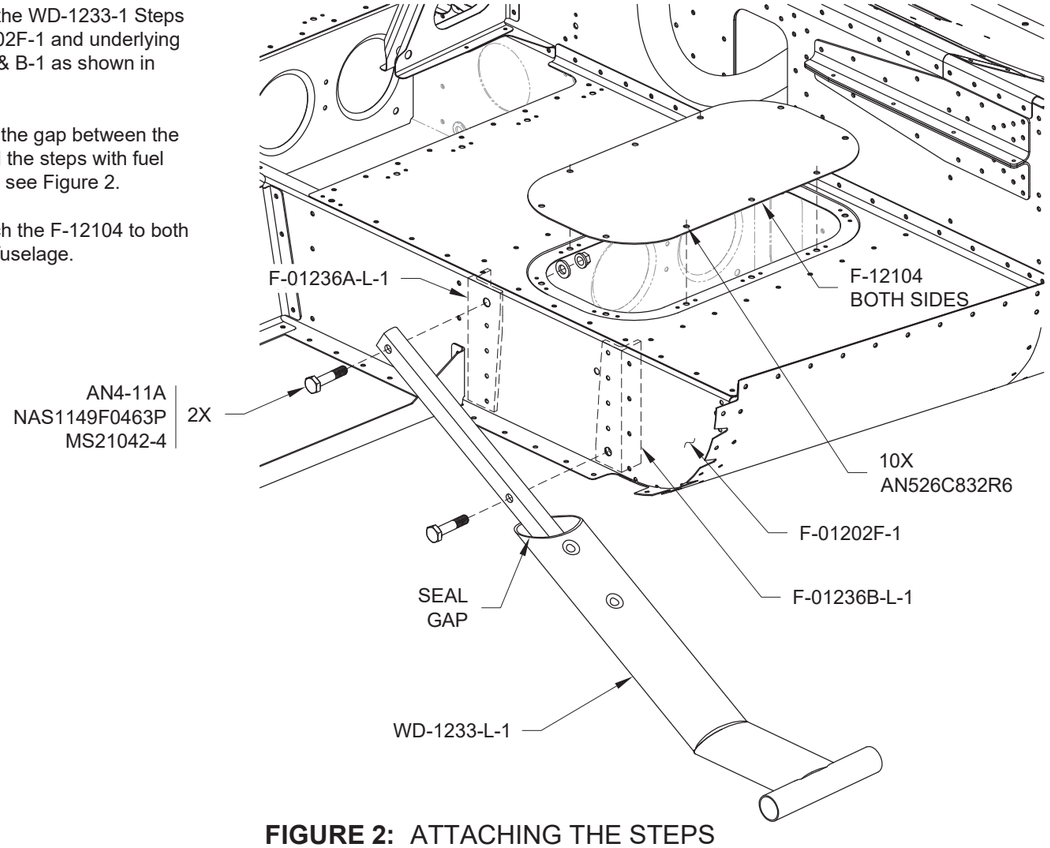


FIGURE 2: ATTACHING THE STEPS
(SOME SKINS NOT SHOWN)

Step 6: Install the baggage area covers as shown in Figure 3.

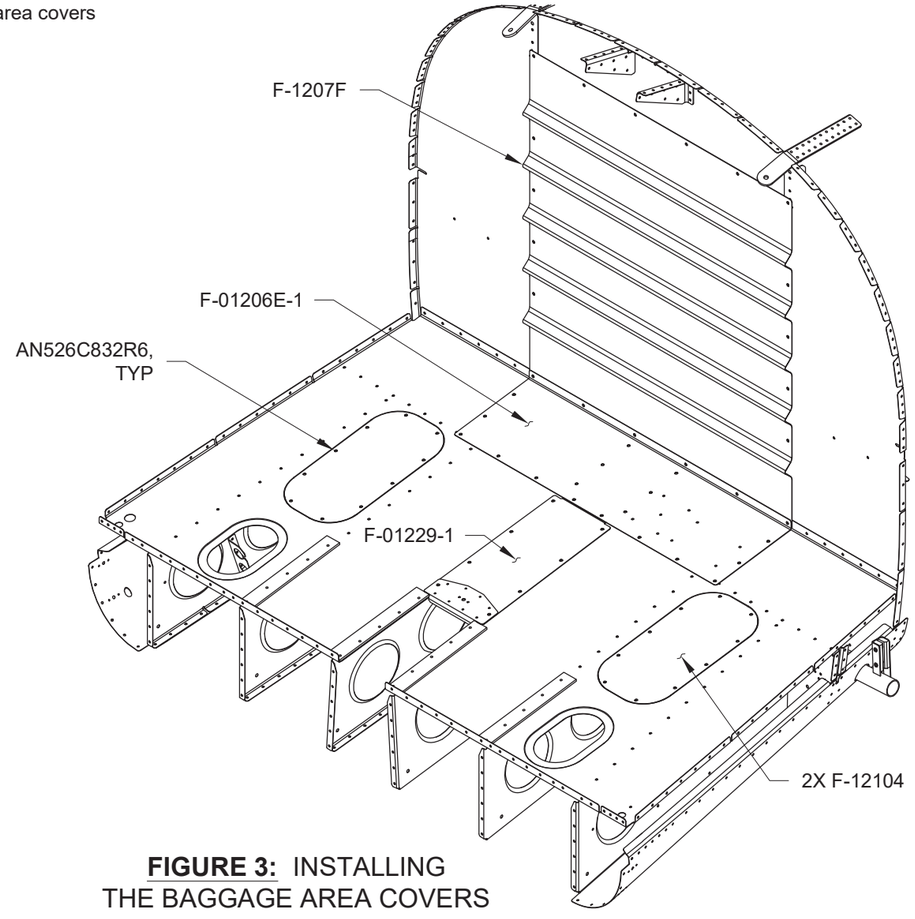


FIGURE 3: INSTALLING
THE BAGGAGE AREA COVERS

Step 7: Attach the F-00032 to both sides of the fuselage as shown in Figure 4.

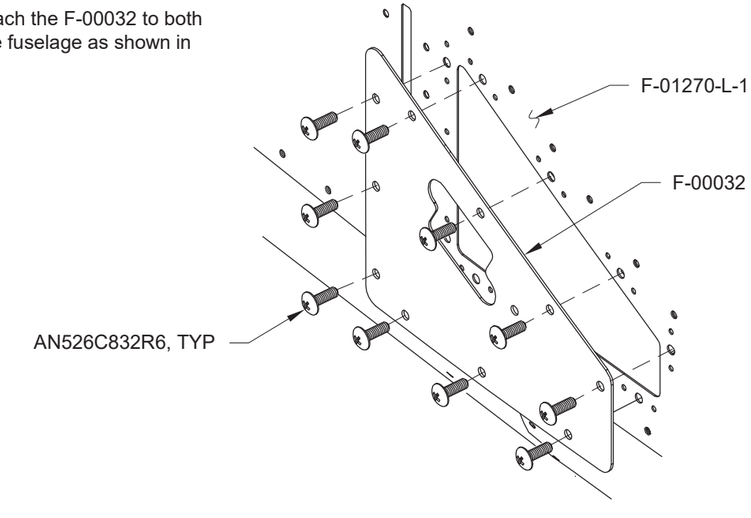


FIGURE 4: ATTACHING THE FUSELAGE SIDE COVERS

Step 1: Attach the covers shown in Figure 1 to the bottom of the fuselage and tailcone.

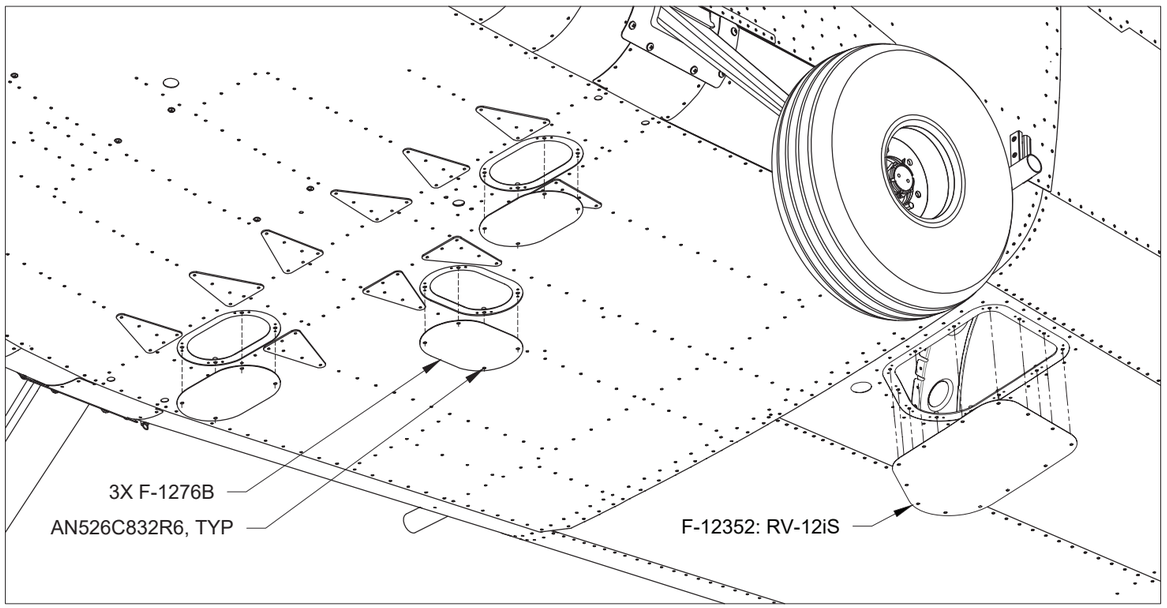


FIGURE 1: ATTACHING THE BOTTOM COVERS

Step 2: Position the Seat Wedge, Seat Bottom, and Seat Back as shown in Figure 2. Pull the crotch strap through the slot in the seat bottom as shown.

These seat cushions have been designed to suit most pilots. For adequate clearance to the canopy, very tall pilots may need to remove foam from the seat bottom cushion or source a custom seat cushion.

The seat back has a Velcro attach strip sewn onto a flap at the top of the seat. The free half of the Velcro strip has an adhesive back and may be applied to the F-1237B Seat Back Angle to hold the upholstered seat cushion in place. Adding Pliobond adhesive to the Velcro strip before installation is recommended to ensure a good hold.

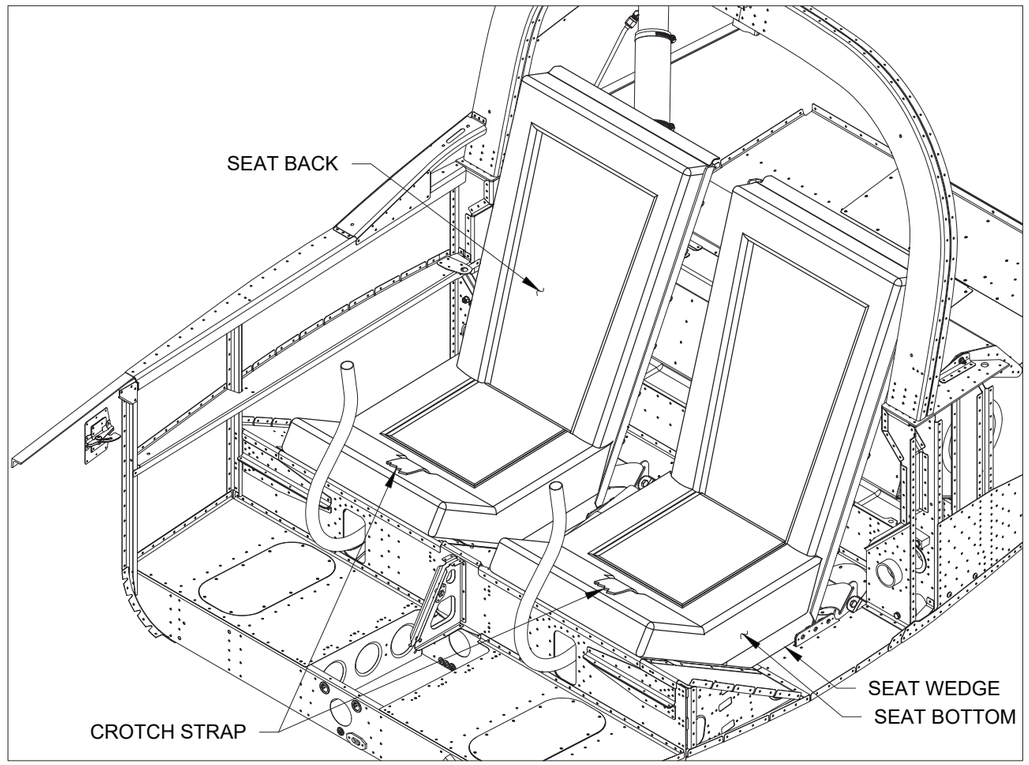


FIGURE 2: SEAT INSTALLATION

Step 1: Install both wings as described on Page 38iS/U-04.

Step 2: Mark the entire perimeter of the wing for a 5/32 in. [3.97mm] gap between the wing root and the fuselage to allow for the VA-204-1 Seal Strips (installed below). Trim the wing skins as needed with sharp metal cutting snips and then finish smooth with a file.

Step 3: Check the gap between the flaperons and fuselage. A minimum gap of 3/16 in. [4.8mm] is required at full up deflection. Use metal cutting snips and a file to remove material from the inboard edges of the flaperon skins to achieve the required gap.

NOTE: Installation of VA-204-1 can be delayed until after paint, but the gap must be sealed prior to any flight.

Step 4: Take an ultra-fine felt tip marker and, holding the pen body against the wing skin, outline each wing, top and bottom, on the side of the fuselage; see Figure 1, Section A-A. Produce an outline approximately 5/32 in. [3.97mm] outside of where the wing meets the fuselage. To avoid a bumpy outline on the fuselage, mark between wing rivets where necessary. Make marks on the fuselage at the top and bottom skin trailing edges to show where the seal starts and ends. Remove the wings.

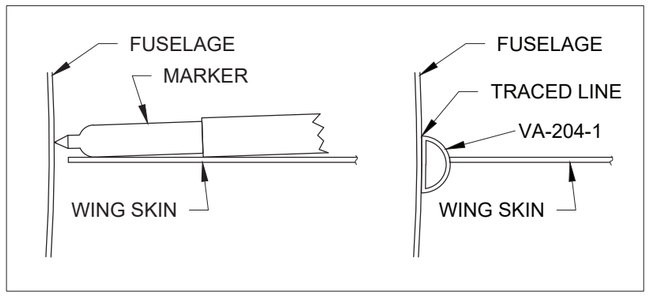
Step 5: Align the edge of the VA-204-1 Seal Strip with the outline traced on the side of the fuselage so that it just covers the line as shown in Figure 1 Section A-A. Care should be taken to make a smooth curve with the seal strip. The seal strip should not be overly stretched as it is installed. It may be helpful to practice following the outlined curve with masking tape before installing the seal strip; once installed the seal strip is very difficult to remove.

Step 6: The seal strips go over a couple of screw heads and the F-00032 Fuselage Side Covers. After installation, the seal strips can be trimmed around the screw heads using a razor blade. Make a slit where the seal strips cross the side covers so that they can be removed.

NOTE: Delay installation of the F-12119C Wing Walk until after the wings have been painted. Anti-slip material for the steps is not included in the kit, but is available from a number of sources and is highly recommended. See manufacturer's instructions for installation details.

Step 7: Apply the F-12119C Wing Walk to both wing surfaces as shown in Figure 1.

Step 8: Apply anti-slip material (approximately 2 inches X 3 inches is needed) to the steps as shown in Figure 1.



SECTION A-A

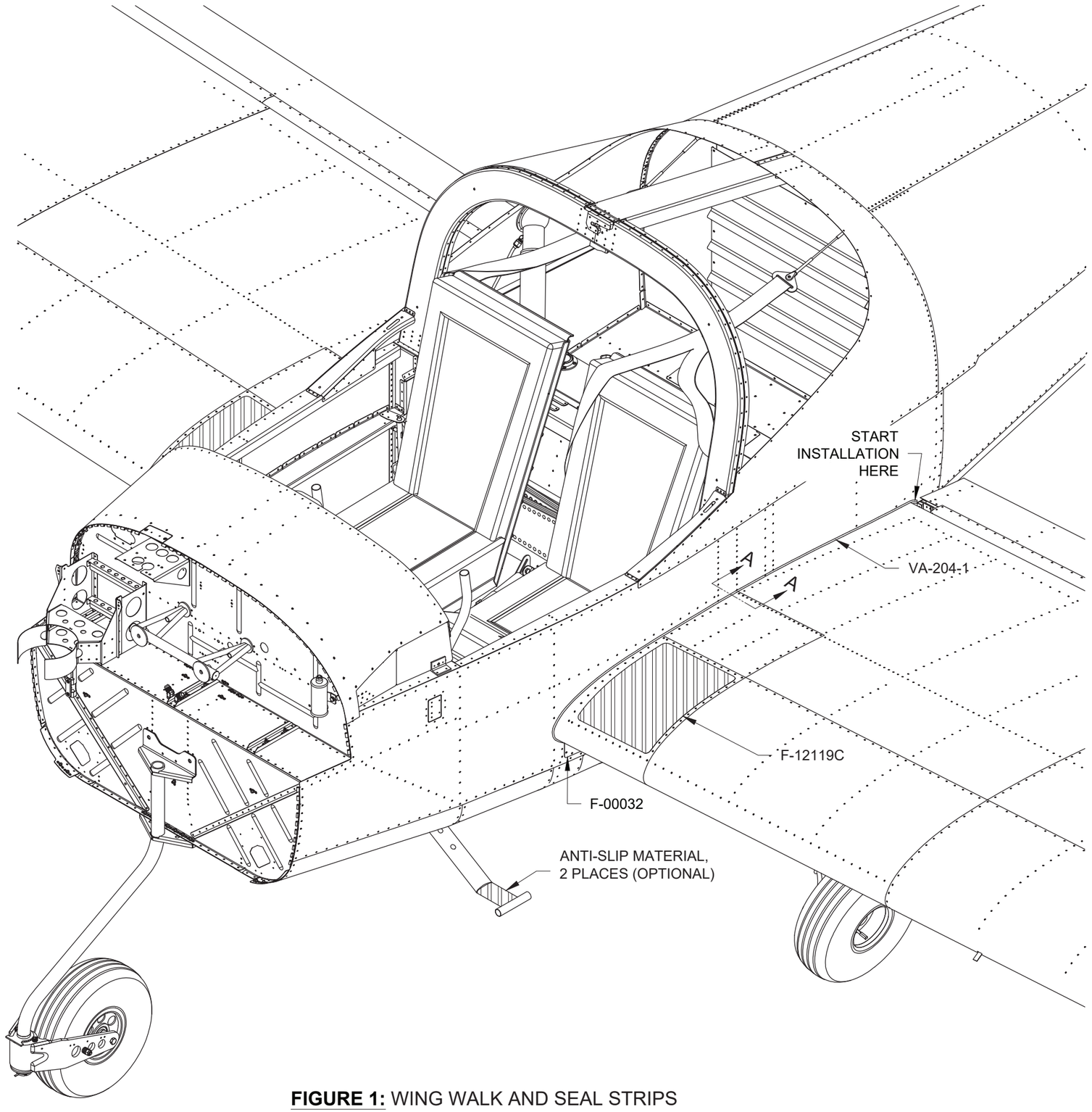


FIGURE 1: WING WALK AND SEAL STRIPS

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NOTE: CHECK PRINTED SCALE 1:1 PER SECTION 3 BEFORE USING TEMPLATES!

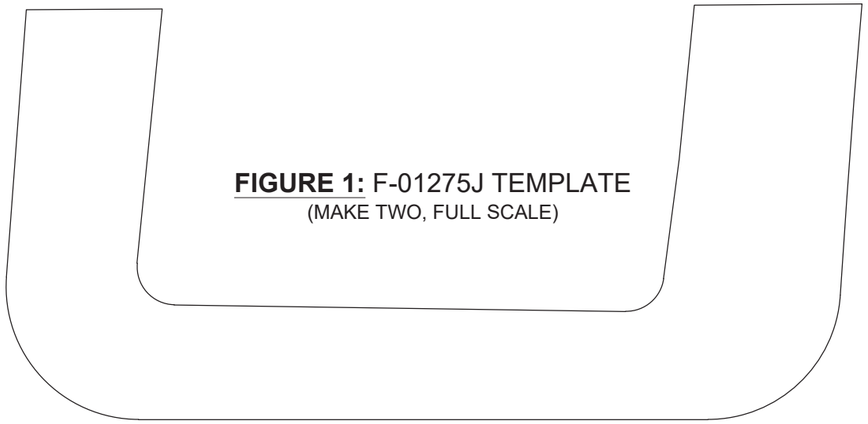

FIGURE 1: F-01275J TEMPLATE
(MAKE TWO, FULL SCALE)

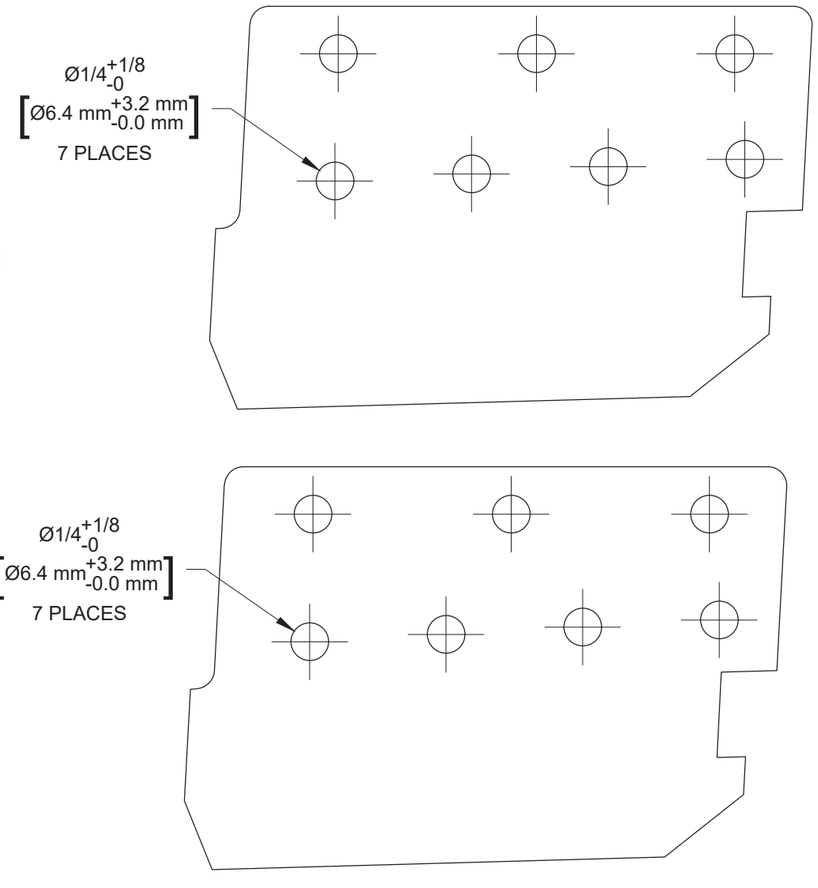

FIGURE 2: F-12105B TEMPLATE
(FULL SCALE)

16
[406.4 mm]

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