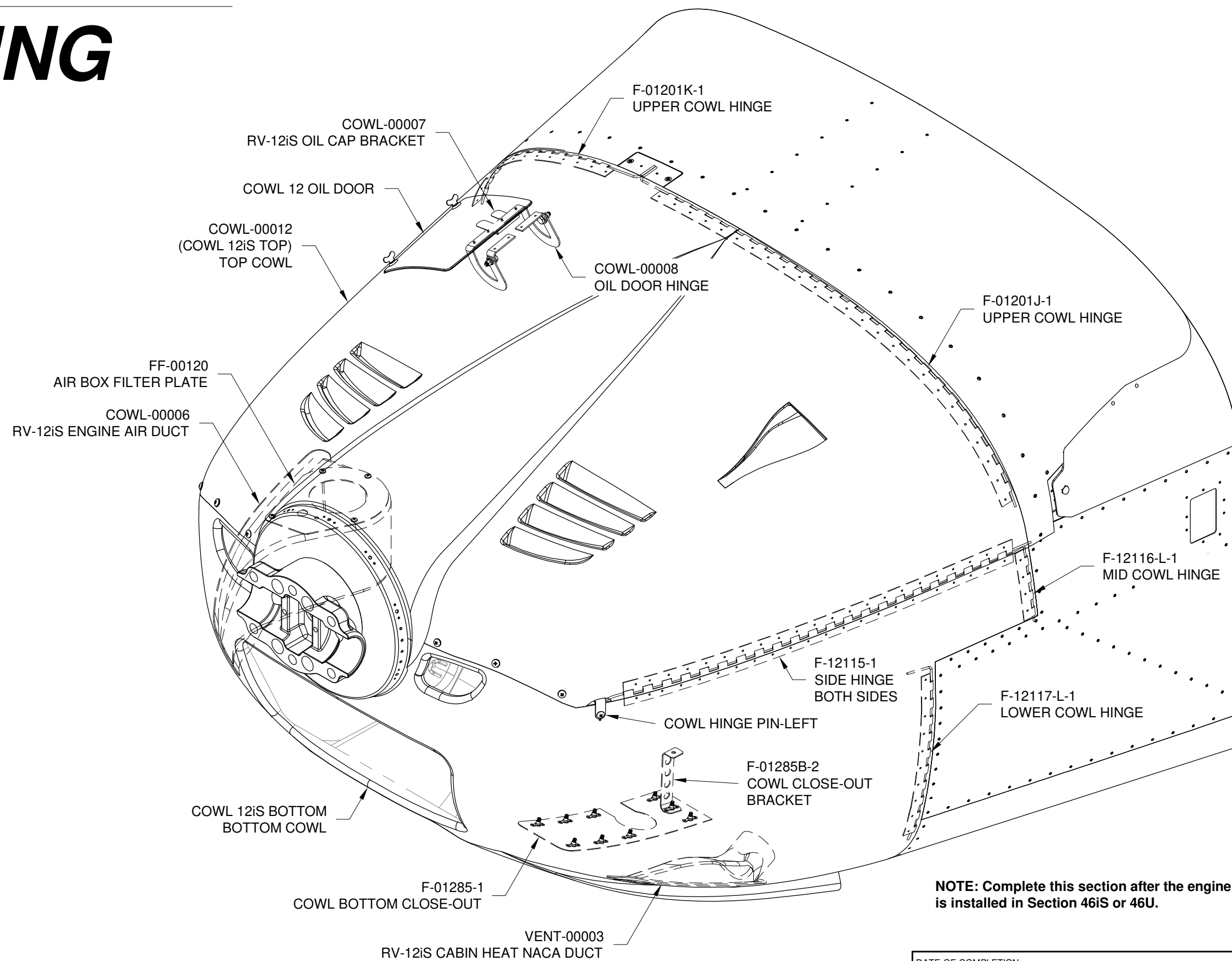


# SECTION 37iS/U: COWLING



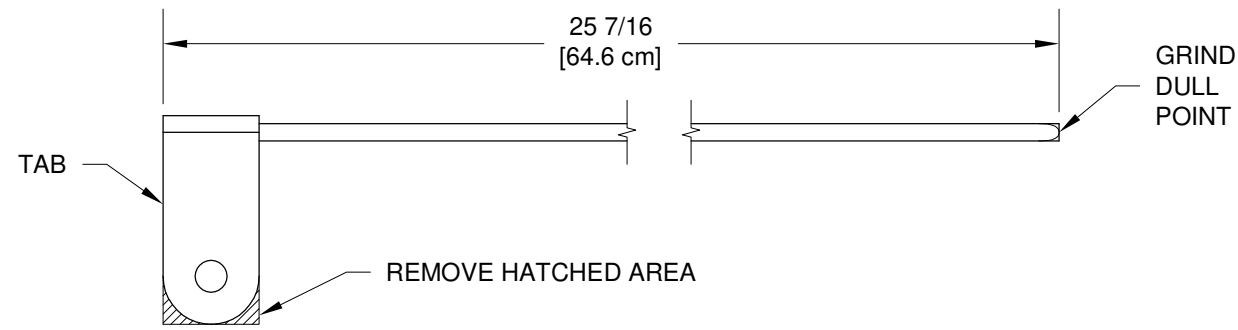
**NOTE: Complete this section after the engine is installed in Section 46iS or 46U.**

DATE OF COMPLETION: _____			
PARTICIPANTS: _____			
DATE: 12/19/18	REVISION: 1	RV-12iS	PAGE: 37iS/U-01



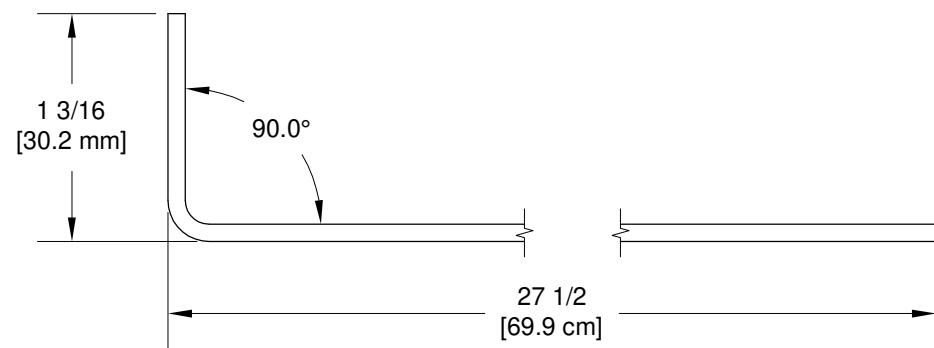
**NOTE:** Complete this section after the engine is installed in Section 46iS or 46U.

**Step 1:** Trim the COWL HINGE PIN-LEFT and COWL HINGE PIN-RIGHT to the dimensions shown in Figure 1.

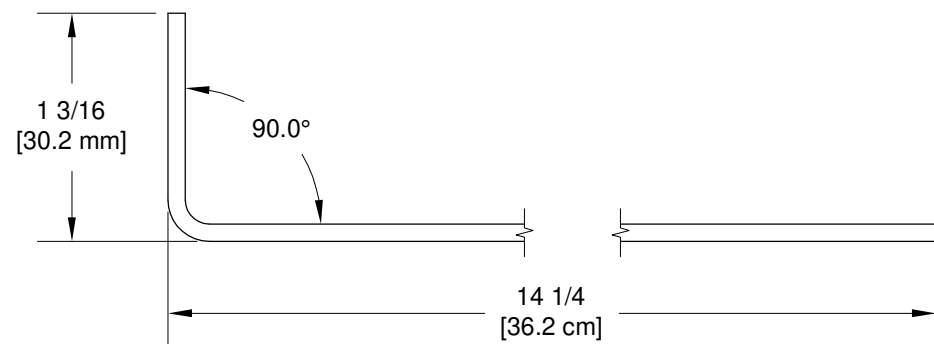


**FIGURE 1:** MAKING THE COWL HINGE PIN-LEFT & -RIGHT

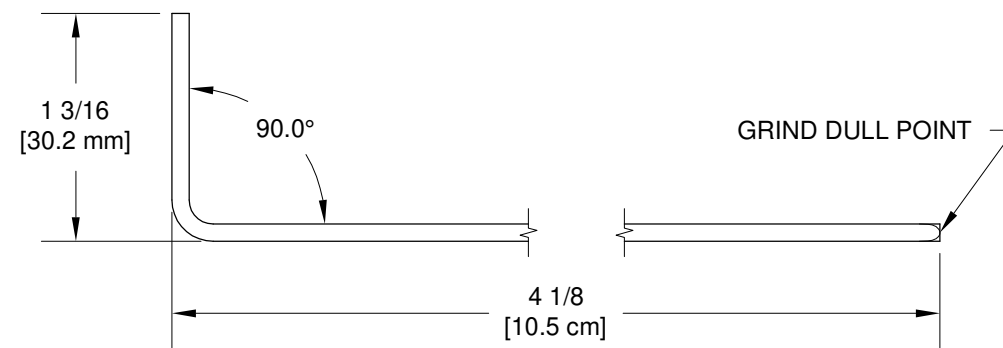
**Step 2:** Make the hinge pins as shown in Figures 2 through 5. Use the hinge pin material left over from Sections 23iS/U and 29iS/U. The hinge pin material removed during fabrication of the F-12115-1 in Figure 6 can also be used.



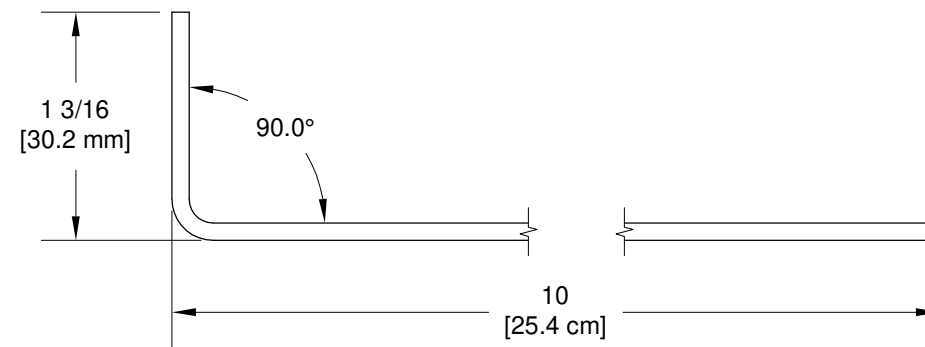
**FIGURE 2:** MAKING THE F-01201J-1 HINGE PIN



**FIGURE 3:** MAKING THE F-01201K-1 HINGE PIN

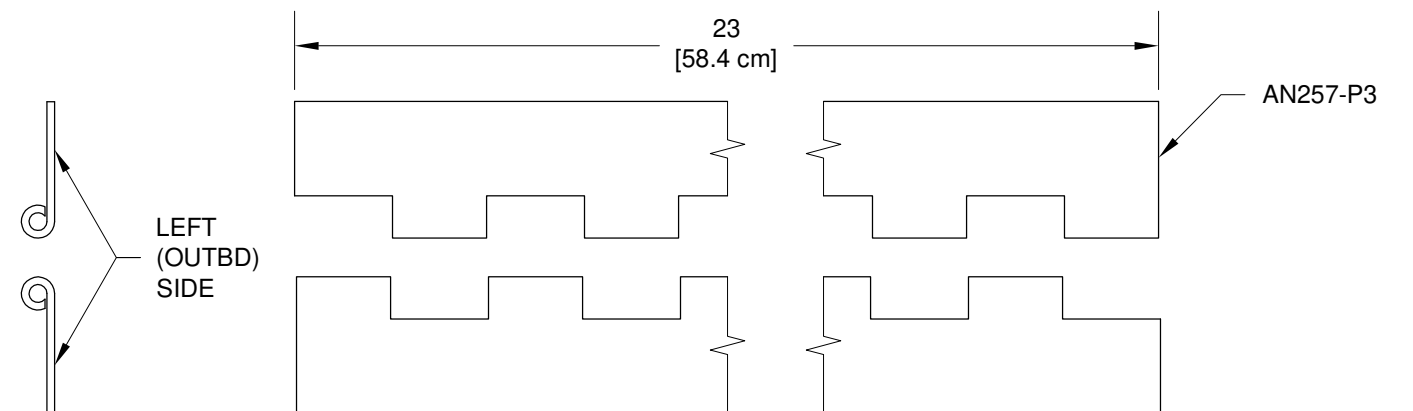


**FIGURE 4:** MAKING THE F-12116-1 HINGE PINS (TWO REQUIRED)

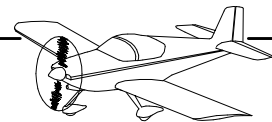


**FIGURE 5:** MAKING THE F-12117-1 HINGE PINS (TWO REQUIRED)

**Step 3:** Make two F-12115-1 hinges as shown in Figure 6. Note the orientation of the eyelets.



**FIGURE 6:** MAKING THE F-12115-1 HINGES (TWO REQUIRED)



**Step 1:** The forward halves of the hinges shown in Figure 1 could have been fabricated in Sections 23iS/U and 29iS/U. If not, simply cut additional AN257-P3 hinge to match the length of the aft halves that are installed on the fuselage. Trim the lower edges of the F-12116-L-1 & -R-1 forward halves to prevent interference with the fuselage skins.

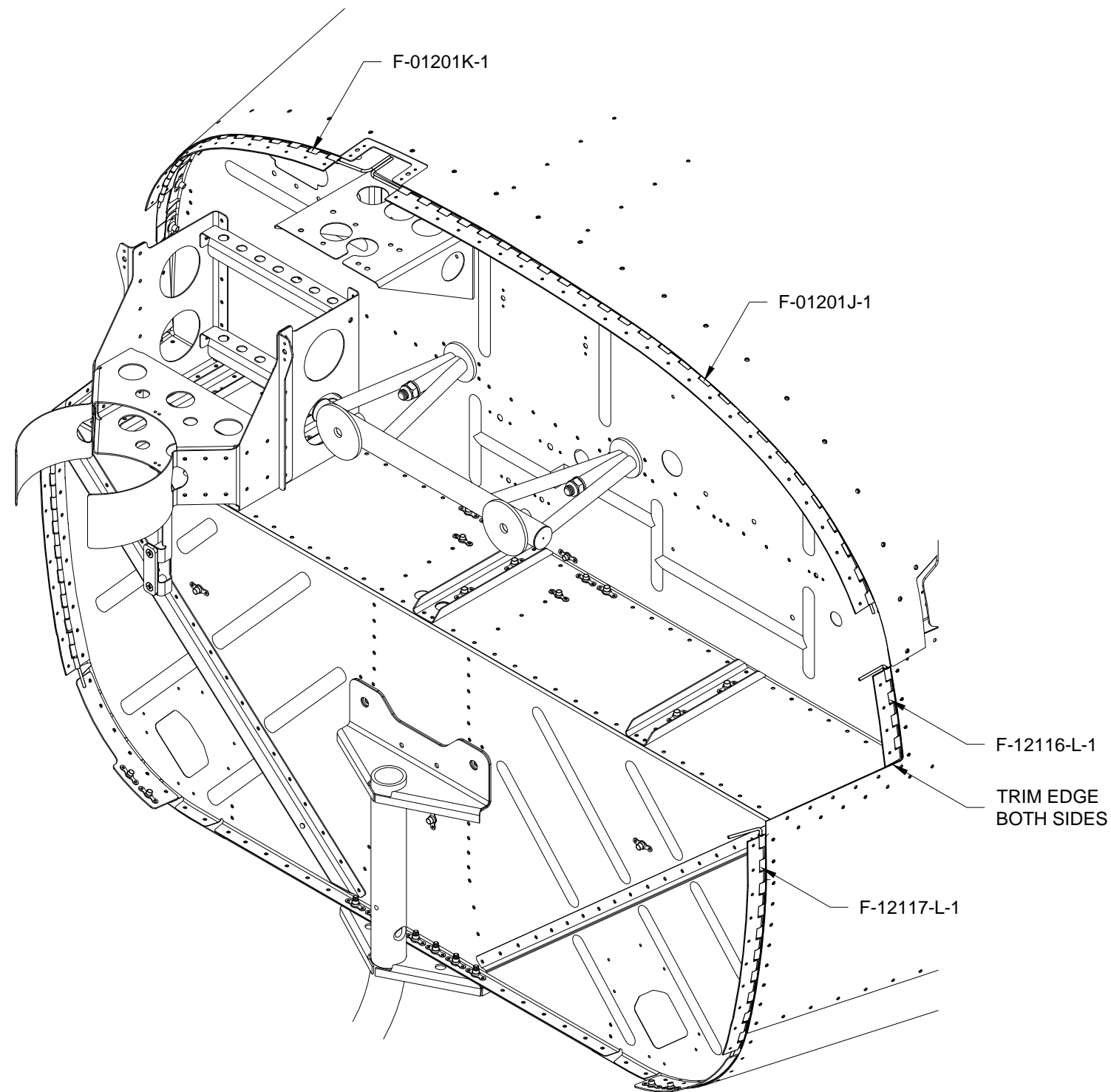
**Step 2:** Bend the hinge halves and hinge pins to their installed shapes (i.e. until they match their corresponding aft hinge halves) as shown in Figure 1.

**Step 3:** Grind the end of the F-01201J-1 & K-1 and F-12117-L-1 & -R-1 hinge pins to an offset point as shown in Figure 2. Offset each point towards the inside of the hinge pin's curve.

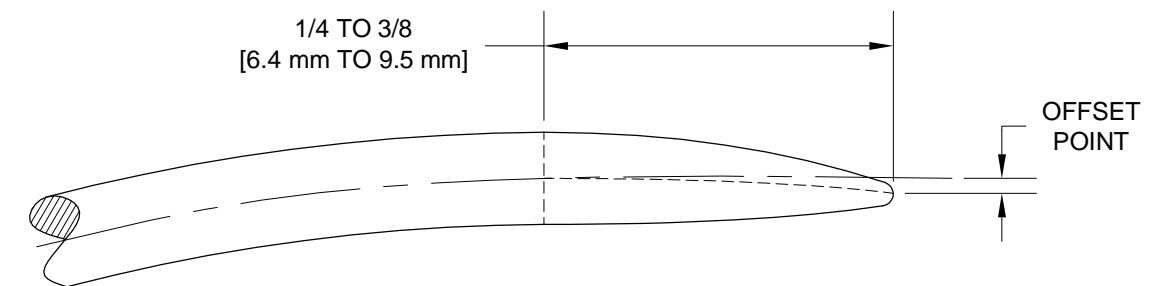
**Step 4:** For the more curved portions of the F-01201J-1 & K-1, bevel the eyelets of both forward and aft hinge halves using a flat file with smooth edges. Bevel as required until the hinge halves easily fit together. See Figure 3.

**Step 5:** Coat all of the hinge pins with a dry lubricant (e.g. Boelube) to ease insertion and removal. (Do this periodically throughout the life of the aircraft.)

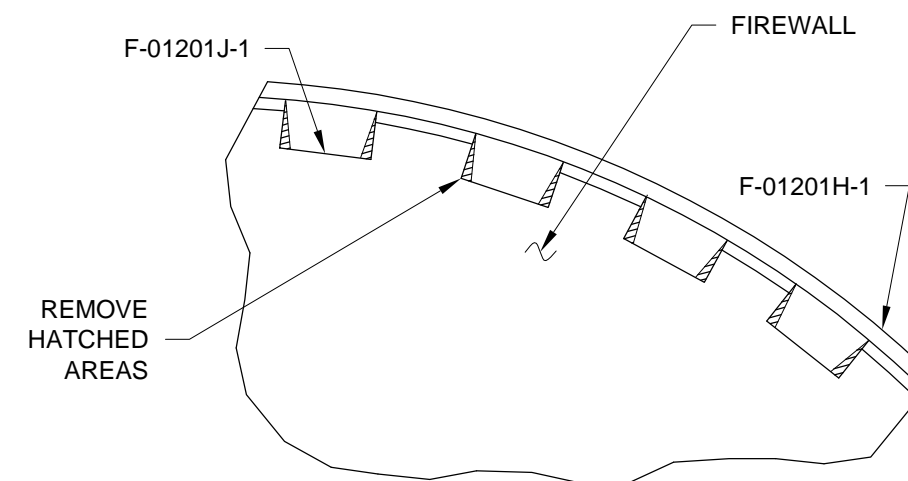
**Step 6:** Install all of the forward hinge halves on the fuselage by inserting their hinge pins.



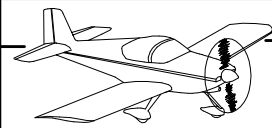
**FIGURE 1: FORMING THE HINGE HALVES AND PINS**



**FIGURE 2: GRINDING THE HINGE PIN ENDS**



**FIGURE 3: BEVELING THE EYELETS**  
(F-01201J-1 SHOWN, FRONT VIEW LOOKING AFT)



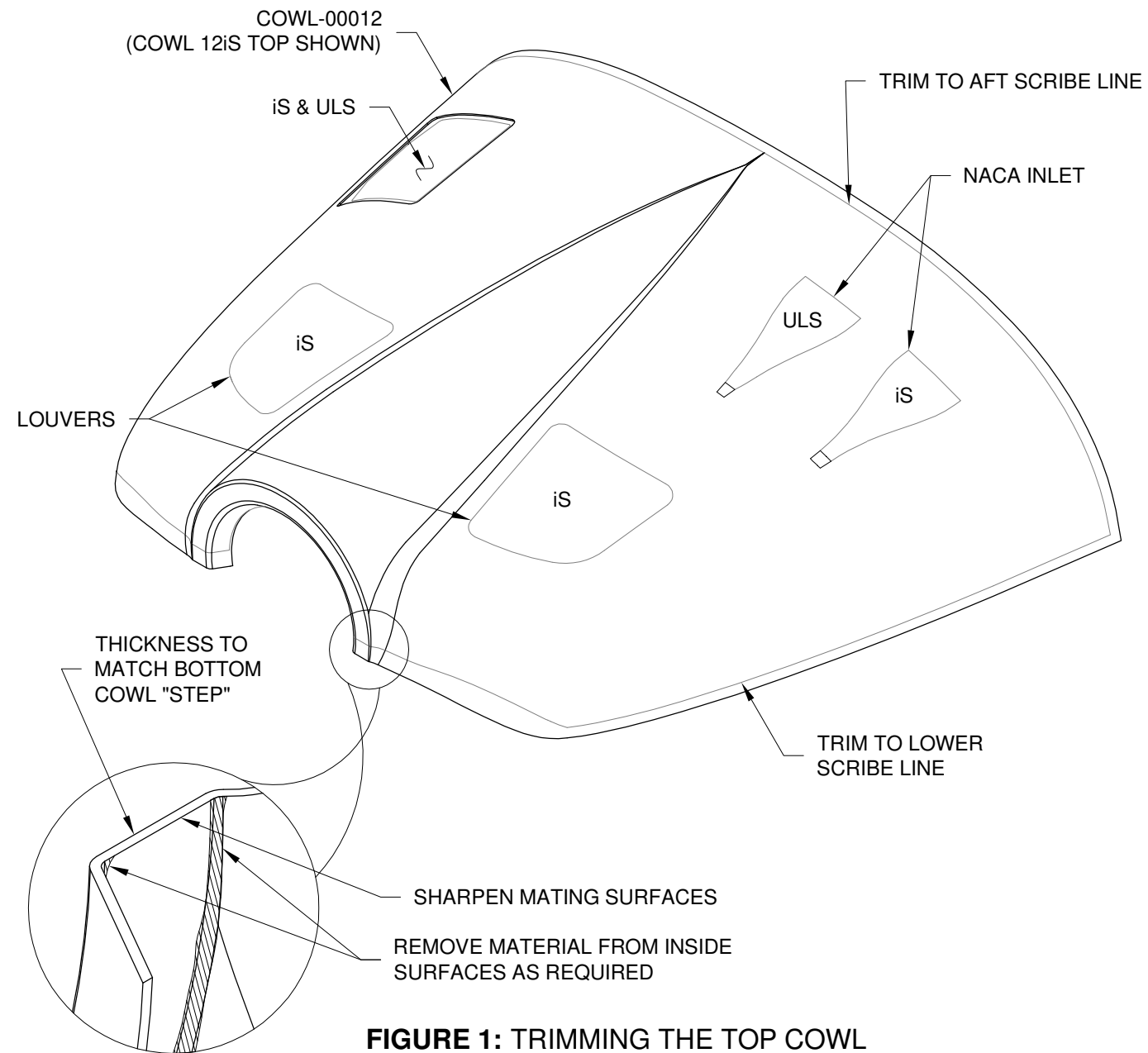
**NOTE: If using the COWL-00012 RV-12iS TOP COWL, the NACA inlet and louvers are molded into the top cowl. Ignore these scribe lines shown in Figure 1.**

**Step 1:** Trace the scribe lines on the top cowl and bottom cowl with a fine point permanent marker. Use a straight edge to reconnect the lines if gaps exist.

**NOTE: DO NOT remove material beyond the scribe lines or sand the cowl exterior.**

**Step 2:** Mark the upper edge of the bottom cowl roughly 4 in. [10.2 cm] aft from the forward corner scribe lines on the left and right sides as shown in Figure 2.

**Step 3:** Trim then sand/file the edges of the top and bottom cowls as indicated in Figures 1 and 2. A long straight sanding block with 80-grit sandpaper works well for this.



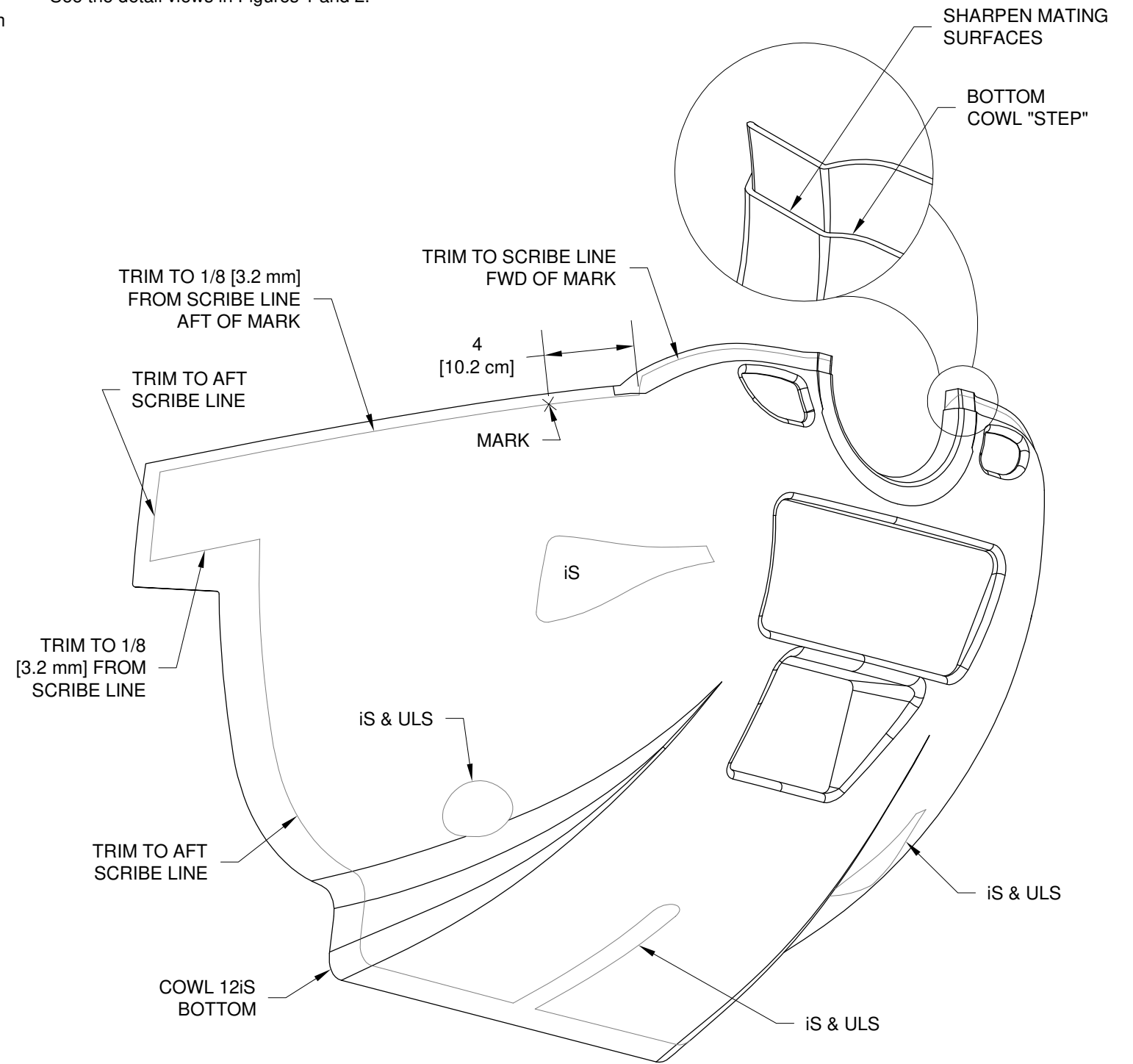
**FIGURE 1: TRIMMING THE TOP COWL**

**Step 4:** For the inlets/cutouts, remove material up to the scribe lines corresponding to your particular engine model (iS or ULS) as indicated in Figures 1 and 2. Except where noted, subsequent figures in this section will depict the iS cowl.

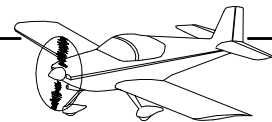
**HINT:** Cut a slot through the center of the scribed gear leg opening. See Figure 2. For the other scribed openings, use a step drill to create holes large enough to accommodate a file or sanding block.

**Step 5:** Sand smooth any high or low spots along the inner surfaces of the top and bottom cowls where hinges will be installed. See Page 37iS/U-01 for hinge installation locations.

**Step 6:** Clean up and sharpen the mating surfaces of the top and bottom cowls around the spinner cutout by removing any excess material. The thickness of the top cowl should match the width of the "steps" in the bottom cowl. See the detail views in Figures 1 and 2.



**FIGURE 2: TRIMMING THE BOTTOM COWL**



**NOTE:** Throughout this section, avoid forcing the top and bottom cowls into alignment. Forcing them to align in one location may cause misalignment in another location. Remove small amounts of material and/or elongate holes in the cowling as required to achieve proper fit. The natural shape of the cowling should match the contour of the fuselage skins.

**Step 1:** Attach the S-1202 and Hub Mount Half to the Prop Shaft using the hardware provided with the propeller as shown in Figure 1. For the Three Blade Prop, use the parts and hardware shown in Section 47AiS/U, except for the prop blades and spinner. Verify that the forward face of the S-1202 is flat: gently push/pull the S-1202 to remove any "dishing".

**Step 2:** Fabricate an alignment tool out of aluminum angle as shown in the detail view of Figure 1.

**Step 3:** Mark a line on the upper forward surface of the top cowl along the cowl/aircraft centerline. The placement of this line does not have to be exact: small left/right errors will have little effect on the vertical alignment of the top cowl.

**Step 4:** Align the hole in the aluminum angle with the centerline mark on the top cowl as shown in Figure 1. Match-Drill #40 the hole from the angle into the top cowl. Cleco the angle to the top cowl.

**Step 5:** Level the fuselage laterally (i.e. in roll). Use the F-1205A as a reference (the brace that spans the width of the fuselage and runs behind/supports the seat backs).

**Step 6:** Apply a strip of 3/4 in. [19.1 mm]-wide tape along the forward edges of the upper and lower fuselage skins to create an offset reference for trimming as shown in Figure 1.

**Step 7:** Place the top cowl on the fuselage, center it behind the S-1202, and slide it forward until it contacts the S-1202. The aluminum angle will rest on top of the S-1202 to align the top cowl vertically.

**Step 8:** Remove excess material from the aft edge of the top cowl as required until it just fits between the S-1202 and the upper forward fuselage skin. There should be no strain on the top cowl that might distort its shape.

**Step 9:** Place a level on the floor as shown and shim it until it indicates level.

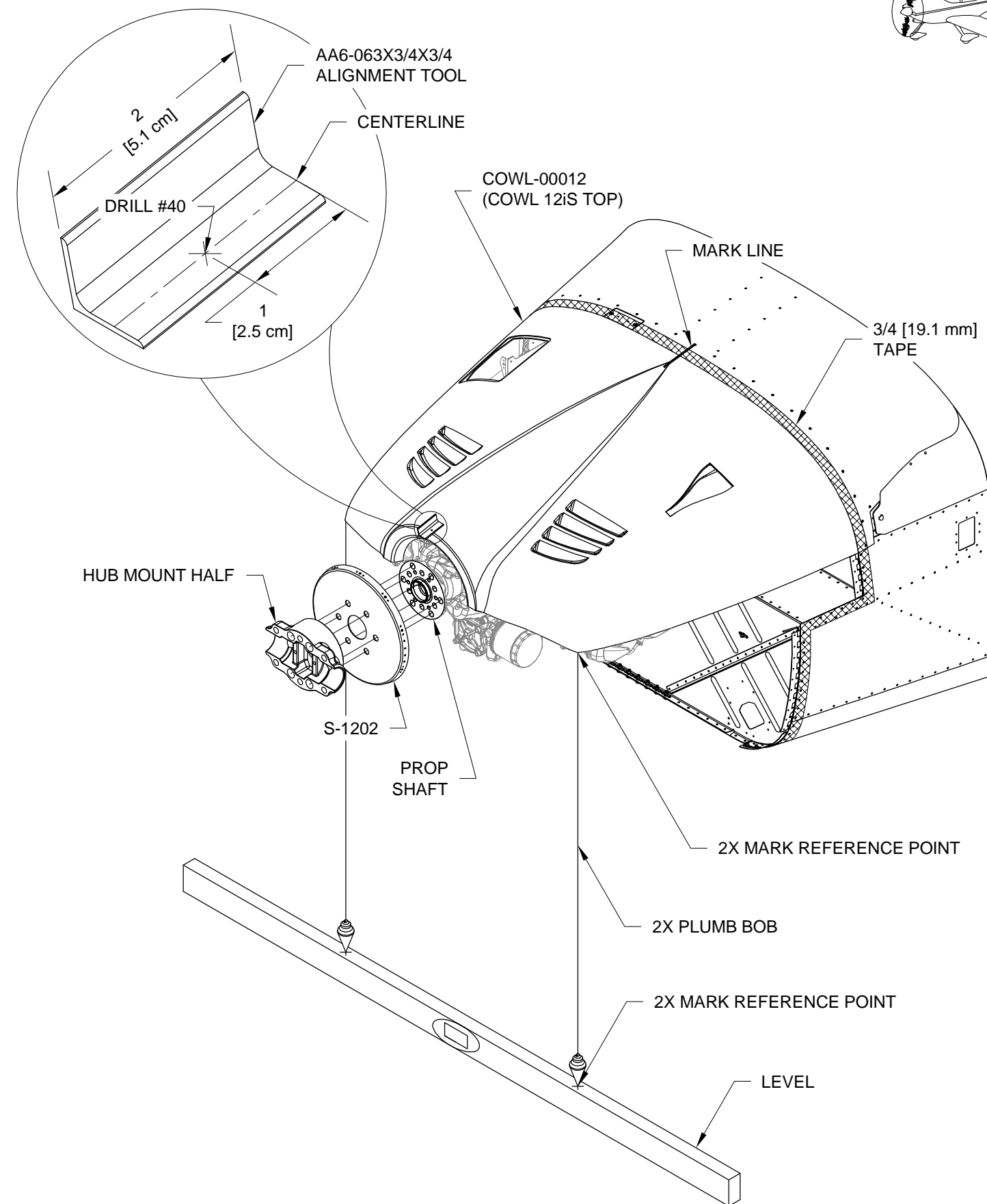
**Step 10:** Hang plumb bobs from the two forward corner scribe lines on the top cowl so that they hang just above the level as shown in Figure 1. Mark the cowl and the level with the plumb bob reference points. Remove the plumb bobs.

**Step 11:** To laterally align the top cowl, slide the aft edge of the top cowl left and right until the distances between the pairs of reference points are equal within 1/16 in. [1.6 mm]. Ensure that the aft corners of the top cowl are also equidistant from two symmetrical points on the fuselage skins.

**Step 12:** Secure the top cowl to the fuselage with tape. **DO NOT** pull the tape too tight or it will distort the shape of the cowl.

**Step 13:** Verify that the top cowl is still laterally aligned and that it is centered behind the S-1202.

**Step 14:** Use a fine point permanent marker to draw a line along the aircraft centerline and across the seam between the top cowl and upper forward fuselage skin as shown in Figure 1. This line will be used to return the top cowl to its aligned position during the fitting process.



**FIGURE 1: LEVELING  
THE TOP COWL**



**NOTE:** The forward/aft alignment of the top and bottom cowls is less important at the start because the aft edges of the cowls will be trimmed to their final dimensions later in this section. At this point, it is more important that there is no strain on the cowls that might distort their shape (caused by forcing the cowls between the S-1202 and the fuselage skins). Any gaps between edges need not be uniform but they should be less than .050 in. [1.3 mm].

Step 1: Remove the top cowl.

Step 2: Make two spinner plate spacers out of wood as shown in Figure 1.

Step 3: Use thin double-sided tape to stick the spacers to the aft side of the S-1202 as shown in Figure 2.

Step 4: Mark lines on the tape to indicate the ends of the all of the hinges as shown in Figure 2.

Step 5: Place the top cowl back on the fuselage, laterally align it and center it behind the S-1202.

Step 6: Clamp the top cowl to the spacers. This will result in a 3/16 in. [4.8 mm] gap between the forward face of the top cowl and the S-1202.

Step 7: If required, mark a trim line on the top cowl 3/4 in. [19.1 mm] forward from the aft edge of the tape and remove material from the top cowl until it fits between the spacers and the upper fuselage skin.

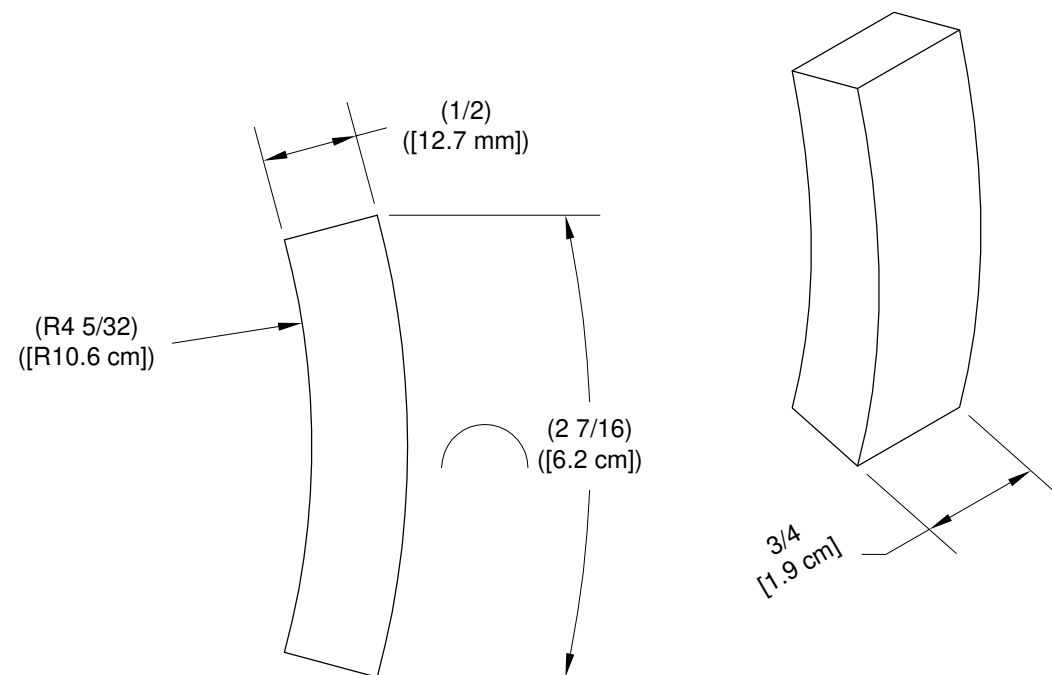
Step 8: Place the top cowl back on the fuselage, laterally align it and center it behind the S-1202.

Step 9: Secure the top cowl to the fuselage with tape. **DO NOT** pull the tape too tight or it will distort the shape of the cowl.

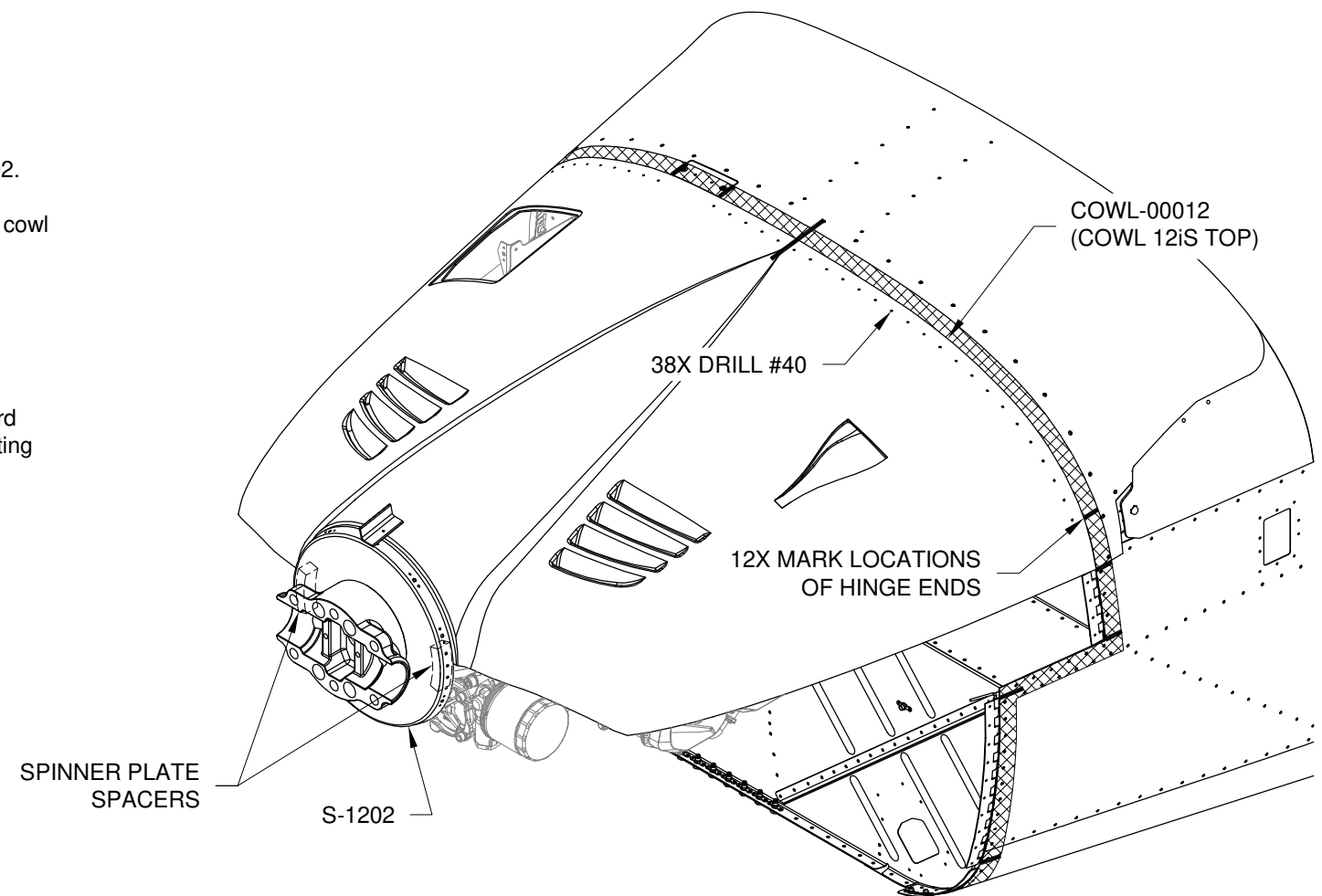
Step 10: Mark the upper hinge rivet locations on the top cowl. Rivets should be 9/16 in. [14.3 mm] forward from the edge of the upper forward fuselage skin. Rivet spacing should be approximately 1 in. [25.4 mm]. Rivets should start 1/4 in. [6.4 mm] from the marks on the tape indicating the F-01201J-1 & K-1 ends.

Step 11: Remove the top cowl and drill #40 the hinge rivet locations.

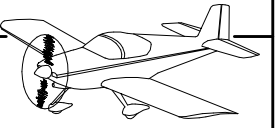
Step 12: Repeat steps 8 and 9.



**FIGURE 1: SPINNER PLATE SPACER**  
(TWO REQUIRED)



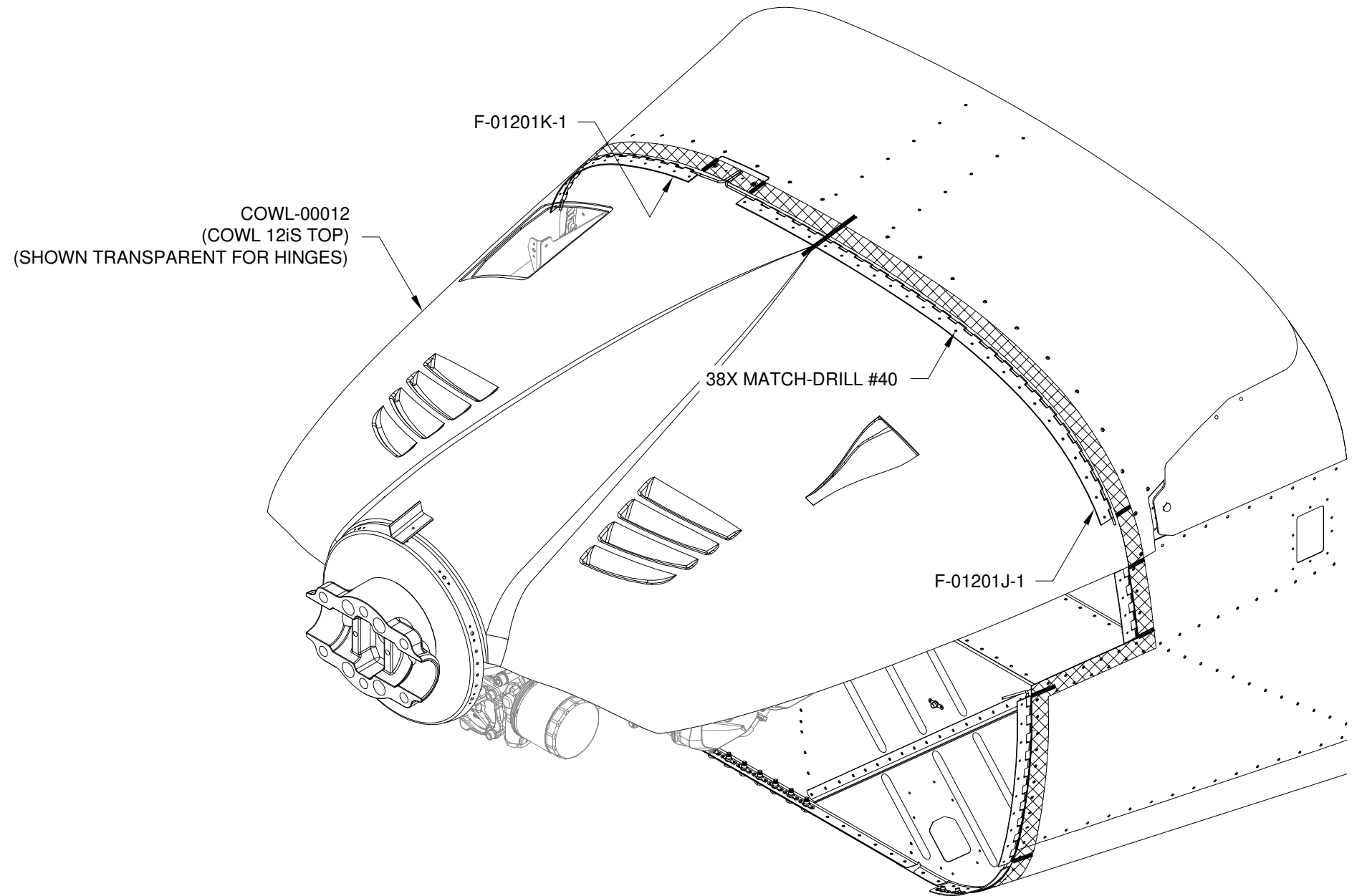
**FIGURE 2: UPPER HINGE RIVET LOCATIONS**



Step 1: Make one or more wooden "hinge support blocks" approximately 1 in. [2.5 cm] by 2 in. [5.1 cm] by 4 in. [10.2 cm] in size.

**NOTE: For all match-drilling operations in this section, keep the drill bit perpendicular to the surface of the cowl. Cleco each drilled hole before drilling the next. Use the hinge support block to hold the hinge against the cowl during drilling. Be aware of debris between parts as drilling progresses. Disassemble and clean every few holes or as necessary.**

Step 2: Match-Drill #40 the holes from the top cowl into the F-01201J-1 & K-1. Match-Drill from inboard to outboard, one hole at a time, while alternating left and right sides. Verify that the top cowl remains properly aligned throughout the drilling process. See Figure 1.



**FIGURE 1: MATCH-DRILLING THE UPPER HINGES**



**Step 1:** Mark lines on the tape to indicate the upper ends of the F-12116-L-1 & -R-1 and F-12117-L-1 & -R-1 hinges as shown in Figure 1.

**Step 2:** Place the bottom cowl on the fuselage. The bottom cowl flanges, and the upper edges that were trimmed to 1/8 in. [3.2 mm] larger than the scribe lines, go up inside the top cowl. Adjust the position of the bottom cowl until its contour matches the fuselage skins. Support the bottom cowl with a stepladder, sawhorse, or similar.

**Step 3:** Clamp the bottom cowl to the spinner plate spacers through the air inlet openings in the bottom cowl. This will result in a 3/16 in. [4.8 mm] gap between the forward face of the bottom cowl and the S-1202.

**Step 4:** Secure the bottom cowl to the fuselage with tape.

**Step 5:** Drill #40 and cleco three holes on each side of the spinner cutout into the top and bottom cowls as shown in the detail view of Figure 1.

**Step 6:** Mark a trim line on the bottom cowl 3/4 in. [19.1 mm] forward from the aft edge of the tape, but only along the F-1271-L & -R corner skins. Remove the bottom cowl.

Remove material from the bottom cowl along the trim line until it fits flush with the F-1271-L & -R.

**Step 7:** Repeat Steps 2, 3, and 4. Confirm that the lower corners of the bottom cowl fit flush with the F-1271-L & -R. Verify that the cowl shape is not distorted by its contact with the fuselage

**Step 8:** Repeat Steps 6 and 7 but for the F-01270-L-1 & -R-1 side skins.

**Step 9:** Trace the lower edge of the top cowl onto the bottom cowl to create a trim line.

**Step 10:** Remove material from the upper edge of the bottom cowl until it fits flush with the lower edge of the top cowl.

**Step 11:** Cleco the bottom cowl to the top cowl at the holes on each side of the spinner cutout and support the bottom cowl. Verify that the bottom cowl is aligned with the top cowl along the sides. Secure the bottom cowl to the fuselage with tape.

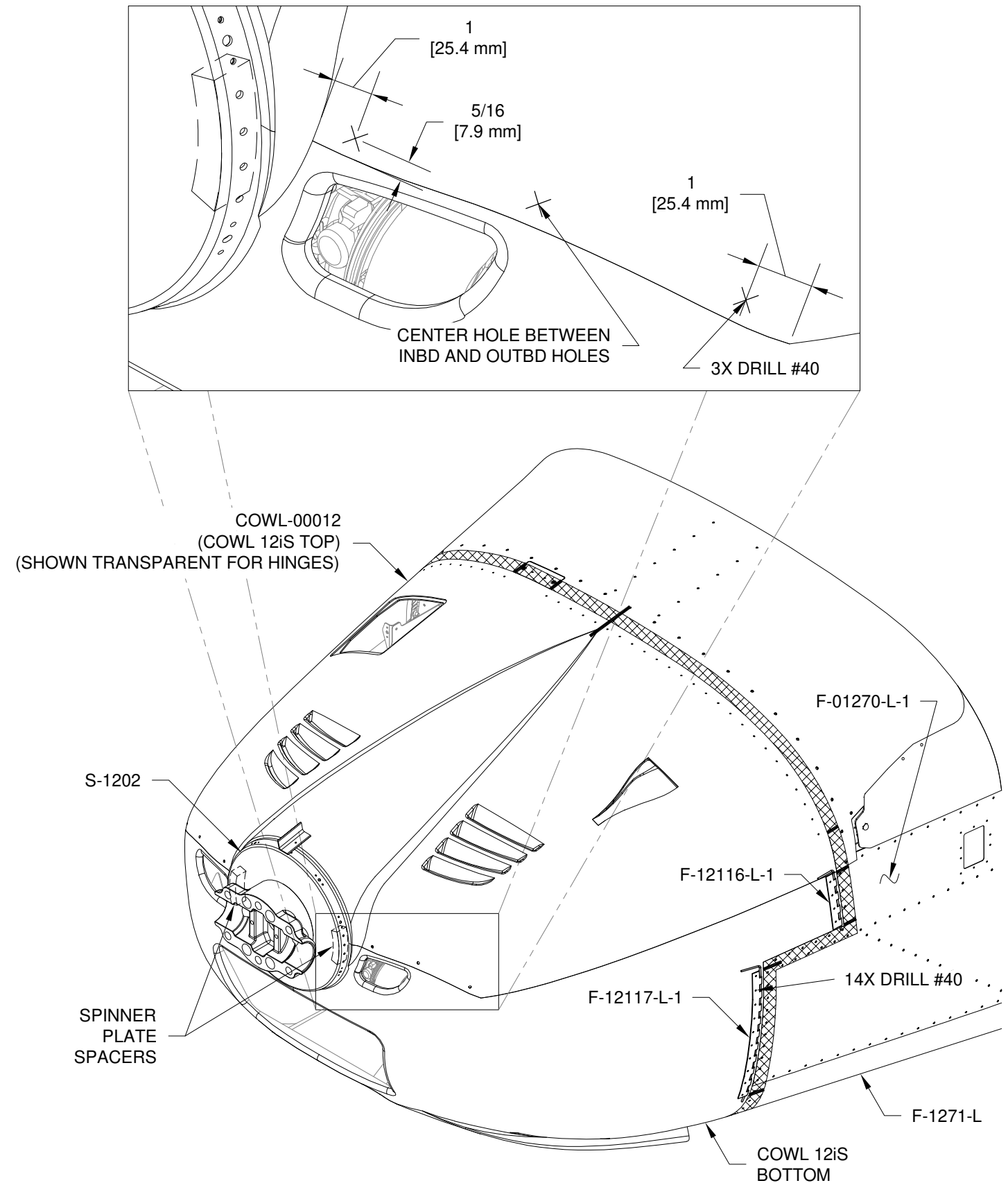
**Step 12:** Mark the F-12116-L-1 & -R-1 rivet locations on the bottom cowl. The rivets should be 9/16 in. [14.3 mm] forward from the edge of the fuselage skins. Rivet spacing should be approximately 7/8 in. [22.2 mm]. Rivets should start 1/4 in. [6.4 mm] from the tape marks indicating the hinge ends.

**Step 13:** Mark the F-12117-L-1 & -R-1 rivet locations on the bottom cowl. The rivets should be 5/8 in. [15.9 mm] forward from the edge of the fuselage skins. Rivet spacing should be approximately 1 in. [25.4 mm]. Rivets should start 1/4 in. [6.4 mm] from the tape marks indicating the hinge ends.

**Step 14:** Remove the bottom cowl and drill #40 the hinge rivet locations.

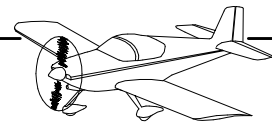
**Step 15:** Place the bottom cowl back on the fuselage. Cleco the bottom cowl to the top cowl and support the bottom cowl. Secure the entire aft edge of the bottom cowl to the fuselage with tape.

**Step 16:** Remove the top cowl from the fuselage by removing the upper hinge pins (i.e. leave the forward hinge halves clecoed to the top cowl). Take care not to disturb the position of the bottom cowl.



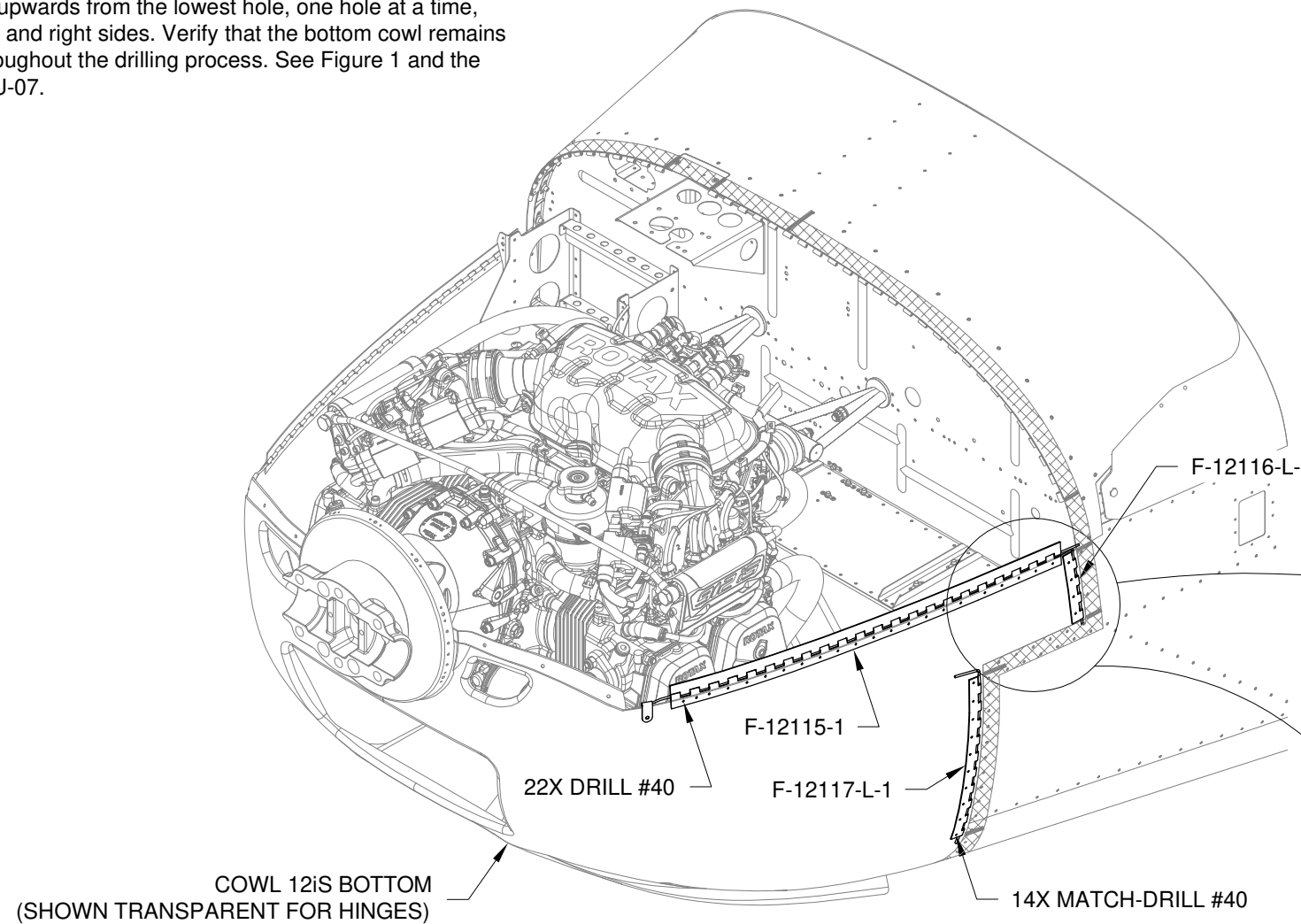
**FIGURE 1: MID & LOWER HINGE RIVET LOCATIONS  
(LEFT SIDE SHOWN)**





Step 1: Match-Drill #40 the holes from the COWL 12iS BOTTOM into the F-12116-L-1 & -R-1 and F-12117-L-1 & -R-1 forward hinge halves.

Match-Drill working upwards from the lowest hole, one hole at a time, while alternating left and right sides. Verify that the bottom cowl remains properly aligned throughout the drilling process. See Figure 1 and the note on Page 37iS/U-07.

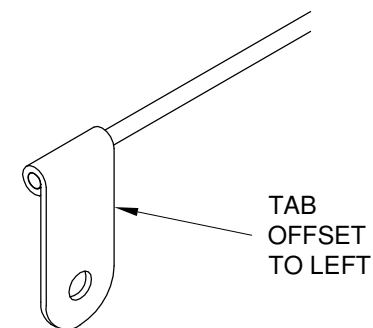


**FIGURE 1: DRILLING THE MID, LOWER, & SIDE HINGES (LEFT SIDE SHOWN)**

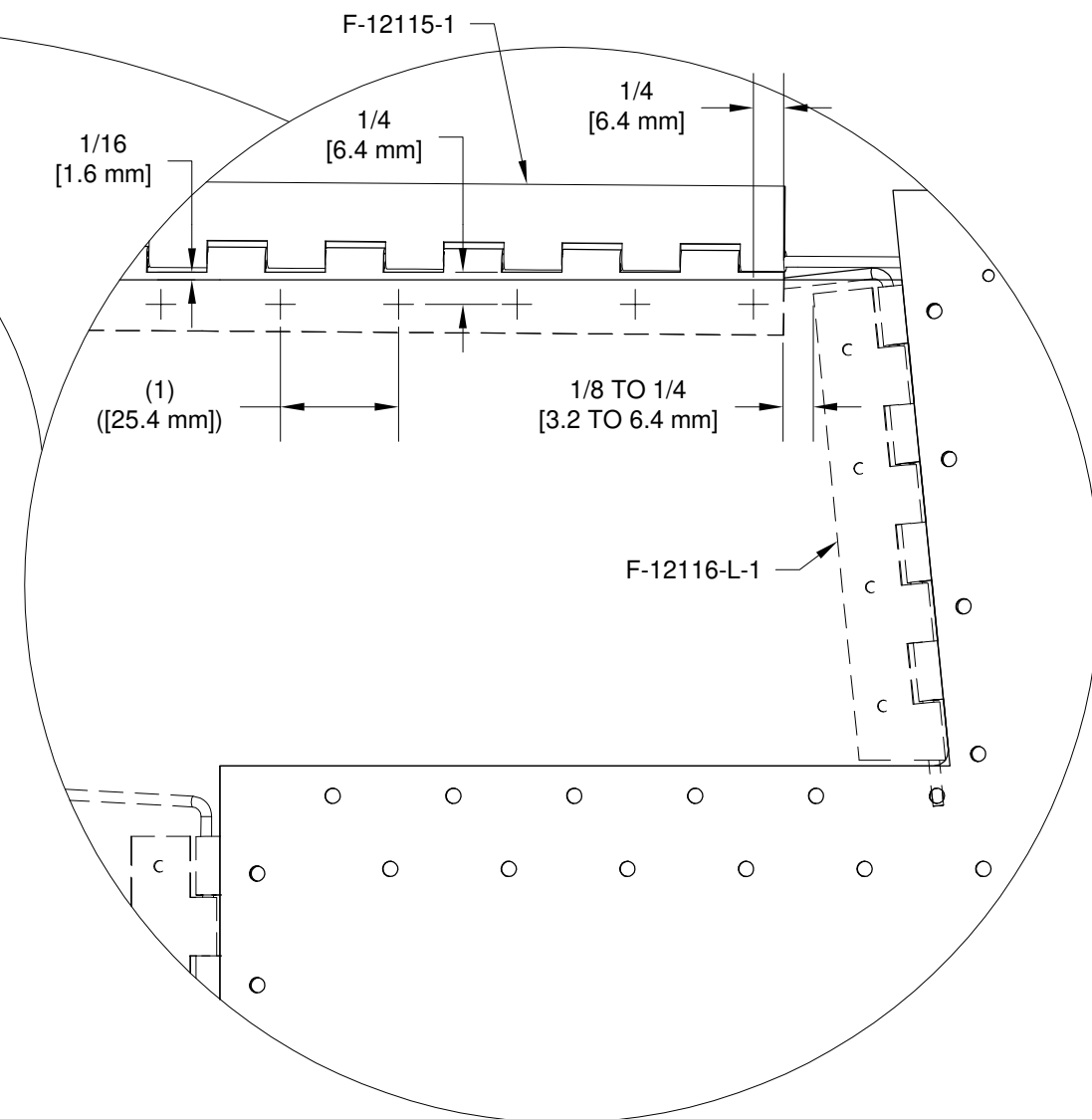
Step 2: Coat the COWL HINGE PIN-LEFT and COWL HINGE PIN-RIGHT with a dry lubricant (e.g. Boelube) to ease insertion and removal. (Do this periodically throughout the life of the aircraft.)

Step 3: Firmly clamp both F-12115-1 hinges (with hinge pins inserted) to the inside of the bottom cowl and mark the hinge rivet locations as shown in the detail view of Figure 1. Note the direction of the hinge pin tab offsets shown in Figure 2.

Step 4: Drill #40 the hinge rivet holes into the bottom cowl and F-12115-1 lower halves.



**FIGURE 2: COWL HINGE PIN-LEFT**

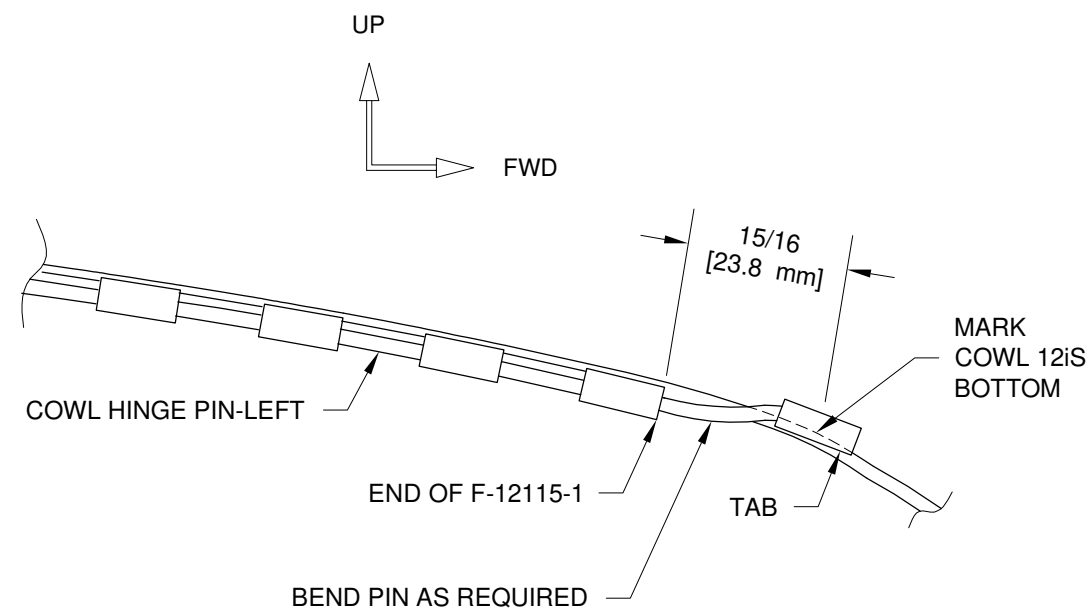




Step 1: Mark the outer surface of the COWL 12iS BOTTOM as shown in Figure 1.

Step 2: Bend/insert the COWL HINGE PIN-LEFT and COWL HINGE PIN-RIGHT until the tabs lay flush on the outer surface of the bottom cowl and the holes in the tabs are roughly centered on the marks made in the previous step.

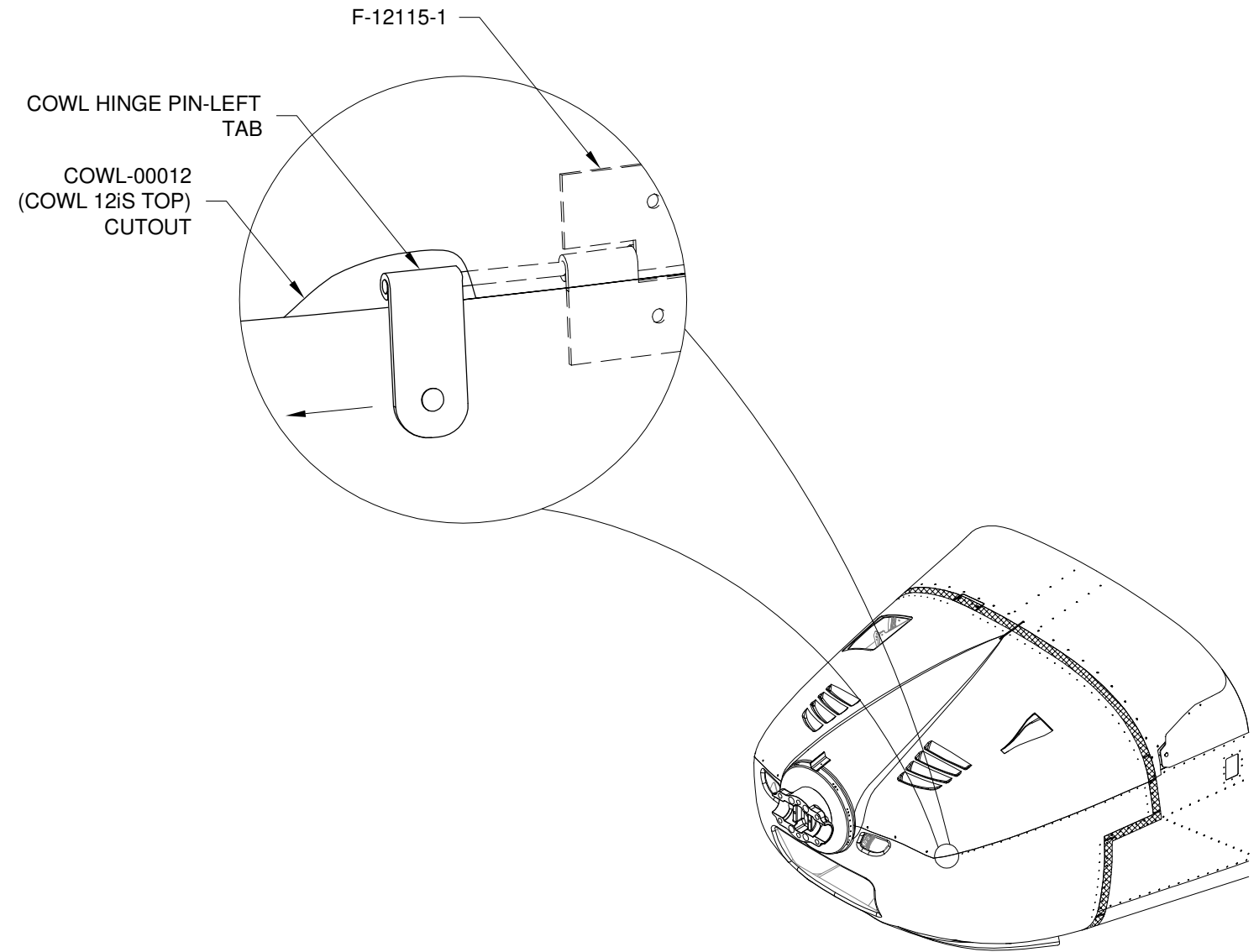
Step 3: Trace the forward and aft edges of the tabs onto the outer surface of the bottom cowl and remove both hinge pins.



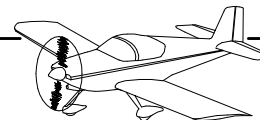
**FIGURE 1: BENDING THE SIDE HINGE PINS**  
(TOP VIEW LOOKING DOWN)

Step 4: Place the top cowl on the fuselage. Transfer the tab edge marks from the bottom cowl to the top cowl and then remove the top cowl.

Step 5: Create cutouts in the top cowl for the left and right tabs as shown in Figure 2. Remove material from the inside forward and aft edges of each cutout to eliminate interference with the hinge pin.



**FIGURE 2: SIDE HINGE CUTOUTS**



**Step 1:** Reinstall the F-12115-1 upper halves using the COWL HINGE PIN-LEFT and COWL HINGE PIN-RIGHT.

**Step 2:** Place the top cowl on the fuselage, cleco the top cowl to the bottom cowl, and insert the F-01201J-1 & K-1 hinge pins (i.e. the upper hinge pins).

**Step 3:** Verify proper alignment of the top and bottom cowls.

**Step 4:** Transfer the rivet hole locations from the F-12115-1 lower halves to the top cowl. Locate the holes 9/16 in. [14.3 mm] above the upper edge of the bottom cowl.

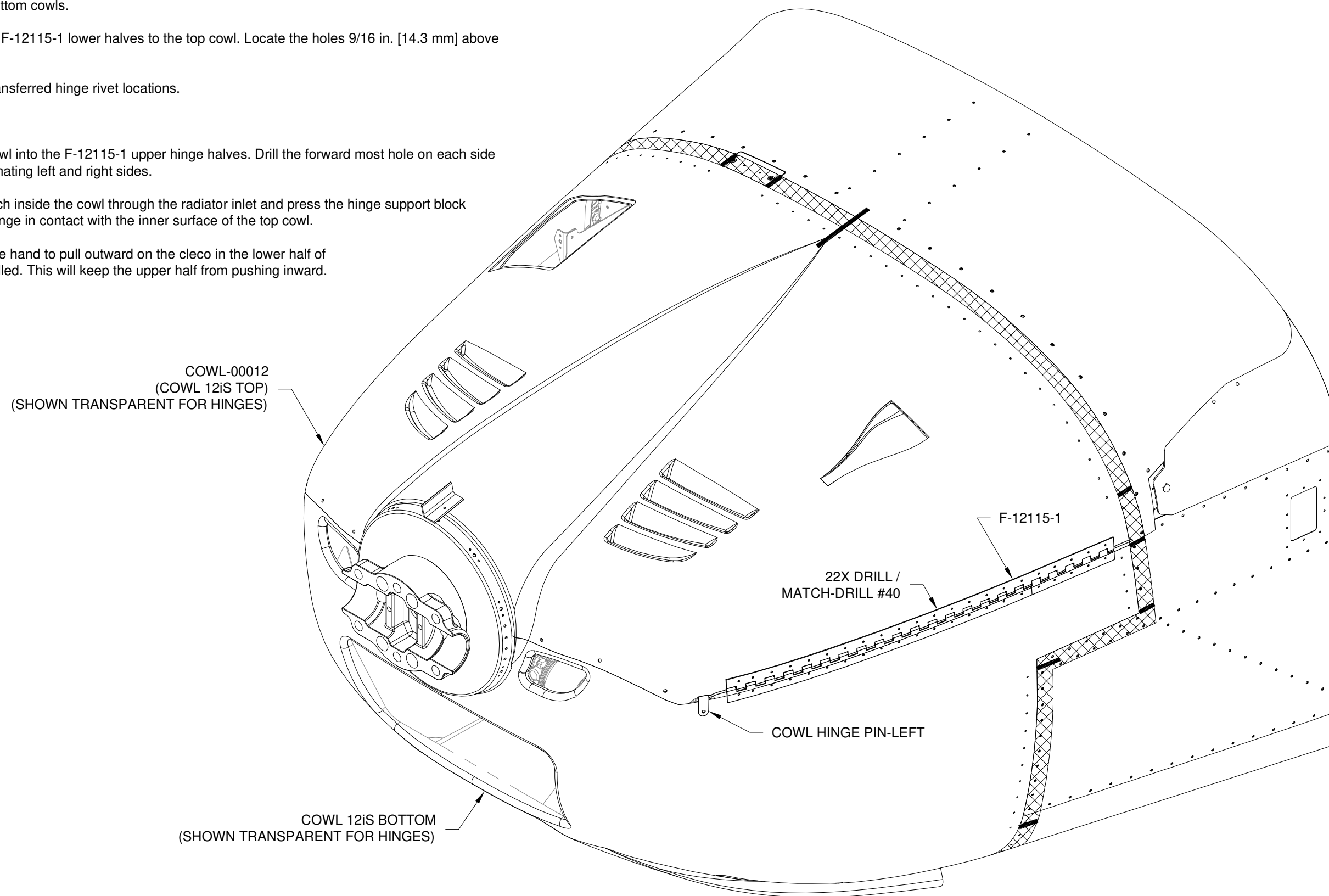
**Step 5:** Remove the top cowl and drill #40 the transferred hinge rivet locations.

**Step 6:** Repeat Steps 2 and 3.

**Step 7:** Match-Drill #40 the holes from the top cowl into the F-12115-1 upper hinge halves. Drill the forward most hole on each side first, then move aft one hole at a time while alternating left and right sides.

When match-drilling the forward most holes, reach inside the cowl through the radiator inlet and press the hinge support block against the upper half of the hinge to keep the hinge in contact with the inner surface of the top cowl.

When match-drilling the remaining holes, use one hand to pull outward on the cleco in the lower half of the hinge that is directly below the hole being drilled. This will keep the upper half from pushing inward.



**FIGURE 1: DRILLING THE SIDE HINGES**  
(LEFT SIDE SHOWN)



Step 1: Final-Drill #19 the holes in the top cowl and bottom cowl on each side of the spinner cutout as shown in Figure 1.

Step 2: Match-Drill #19 the tab holes in the COWL HINGE PIN-LEFT and COWL HINGE PIN-RIGHT into the bottom cowl.

Step 3: Remove the top and bottom cowls and label all of the hinges with their part numbers. See Page 37iS/U-13 or 37iS/U-01.

Step 4: Uncleco and deburr all of the hinges.

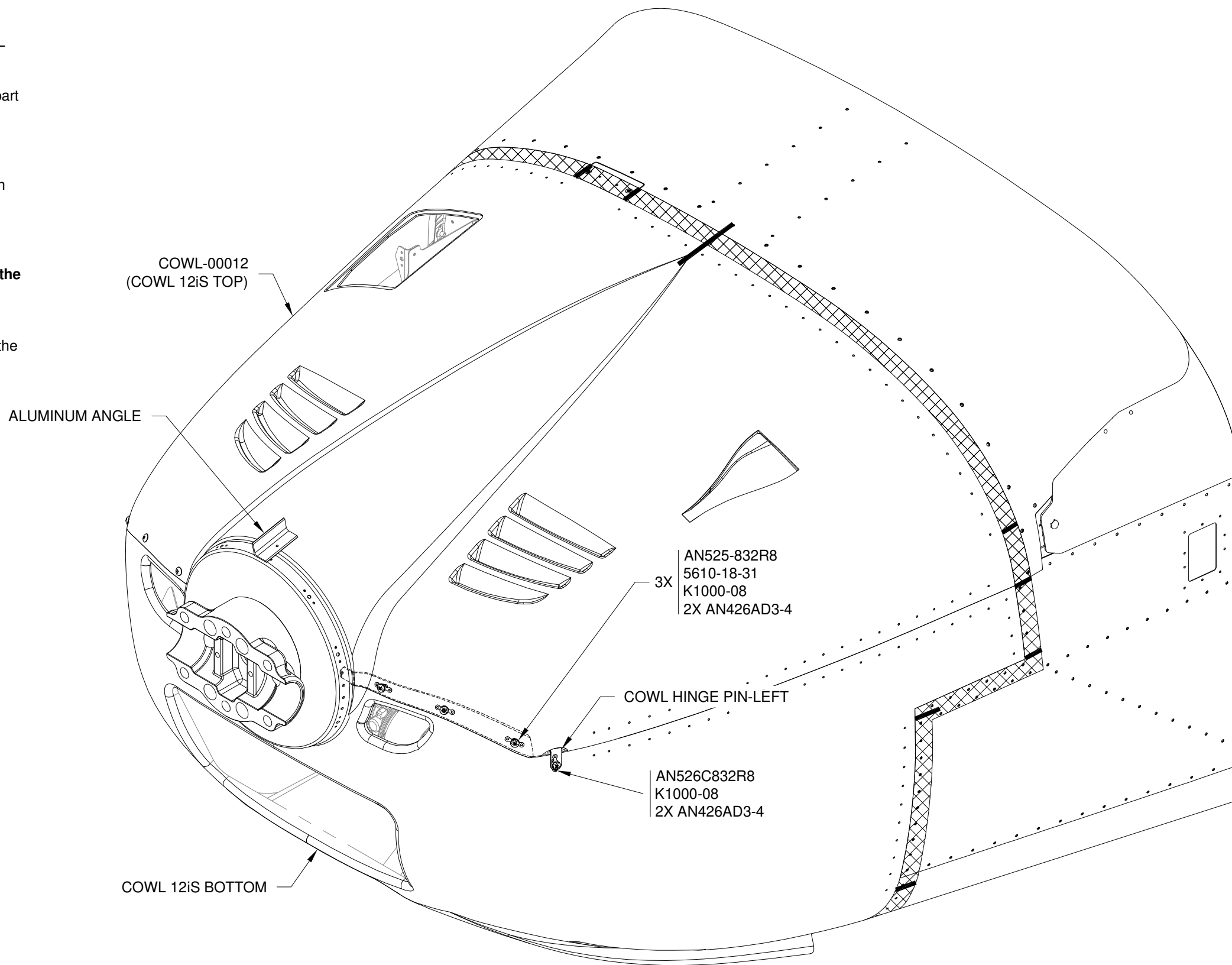
Step 5: Use #8 screws to temporarily hold nutplates against the two tab holes on the inside of the bottom cowl. Orient these nutplates vertically.

Step 6: Match-Drill #40 the nutplate rivet holes into the bottom cowl.

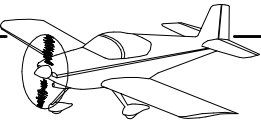
**NOTE: When setting solid rivets in fiberglass composites, do not fully set the rivets (i.e. make the shop head height approximately 1.2 times the hole diameter).**

Step 7: Machine countersink the nutplate rivet holes and then rivet nutplates to the two tab holes as shown in Figure 1.

Step 8: Repeat Steps 5, 6, and 7 for the holes in the **bottom cowl** on each side of the spinner cutout as shown in Figure 1.



**FIGURE 1: ATTACHING NUTPLATES**  
(LEFT SIDE SHOWN)



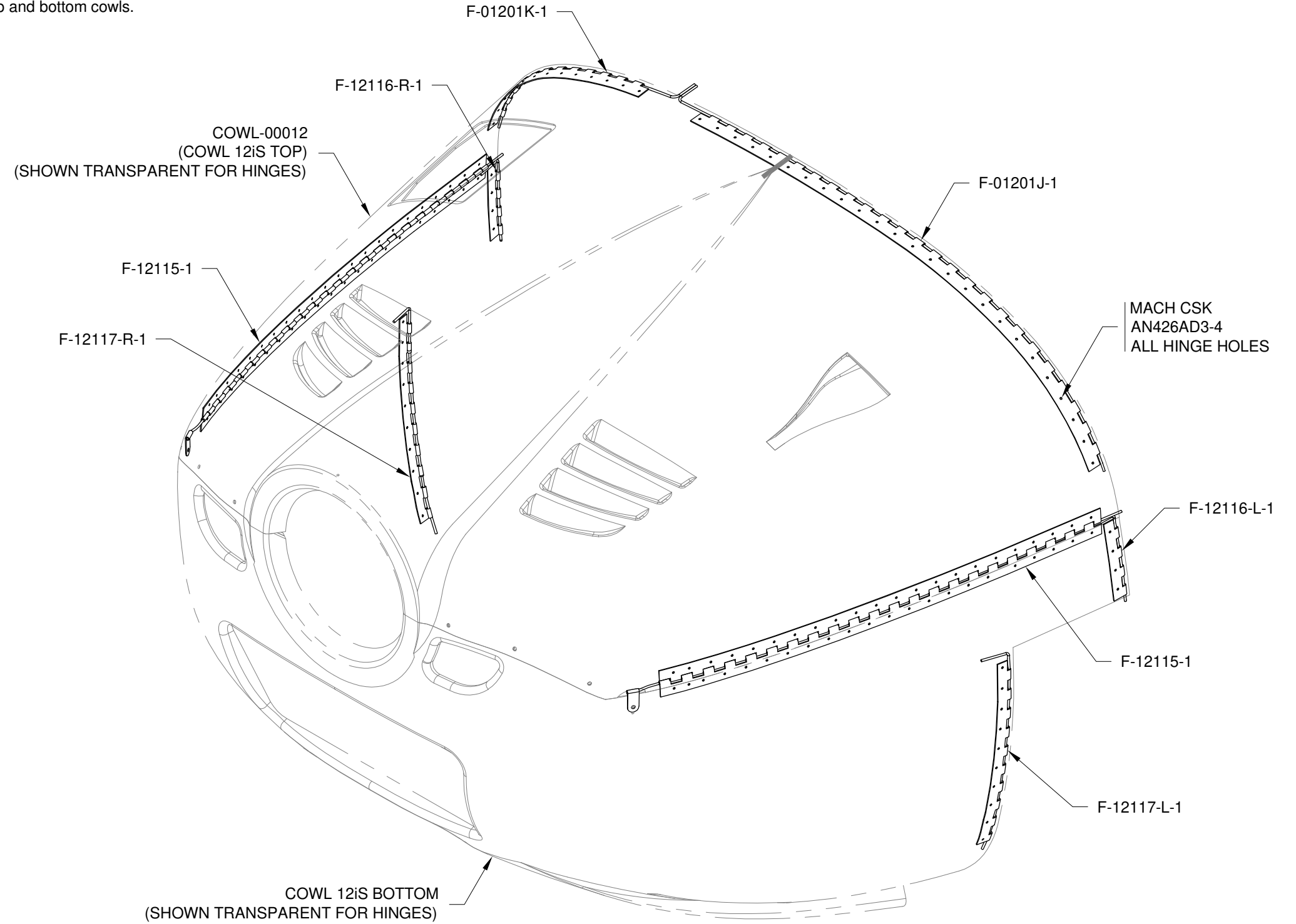
Step 1: Cleco all of the hinges to the top and bottom cowls as shown in Figure 1. Only cleco every other hole.

Step 2: Machine countersink and rivet the holes in the top and bottom cowls that are not clecoed.

Step 3: Remove the clecos.

Step 4: Machine countersink and rivet the remaining hinge rivet holes in the top and bottom cowls.

Step 5: Remove the aluminum angle from the top cowl.



**FIGURE 1: RIVETING THE HINGES**



Step 1: Separate the COWL 12 OIL DOOR and COWL-00008 as shown in Figures 1 and 2.

Step 2: Bend the oil door as required to match the contour of the top cowl.

Step 3: Center the COWL 12 OIL DOOR within the oil door recess in the top cowl and secure the door with tape.

Step 4: Use a step drill to match-drill 1/4 the two camloc holes from the COWL 12 OIL DOOR into the top cowl. See Figure 3.

Step 5: Remove the COWL 12 OIL DOOR. Install a camloc fastener/receptacle in each hole in the top cowl. See Figure 3. Temporarily install two flat washers instead of the camloc retaining washers.

Step 6: Rotate the camloc fasteners until the wings are parallel to the edge of the oil door recess as shown in Figure 3. Center the camlocs in the holes.

Step 7: Match-Drill #40 the camloc receptacle attach holes into the top cowl. Insert (but do not squeeze) a rivet into the first hole before match-drilling the second hole.

Step 8: Remove the camlocs and machine countersink the receptacle rivet holes in the top cowl as shown in Figure 3.

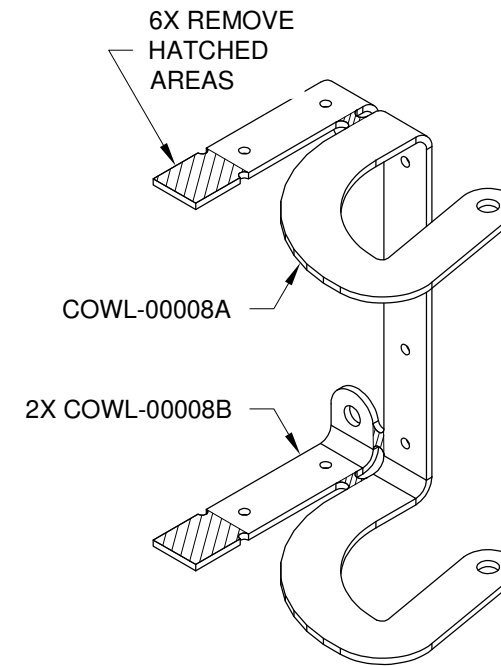


FIGURE 2: SEPARATING THE OIL DOOR HINGE

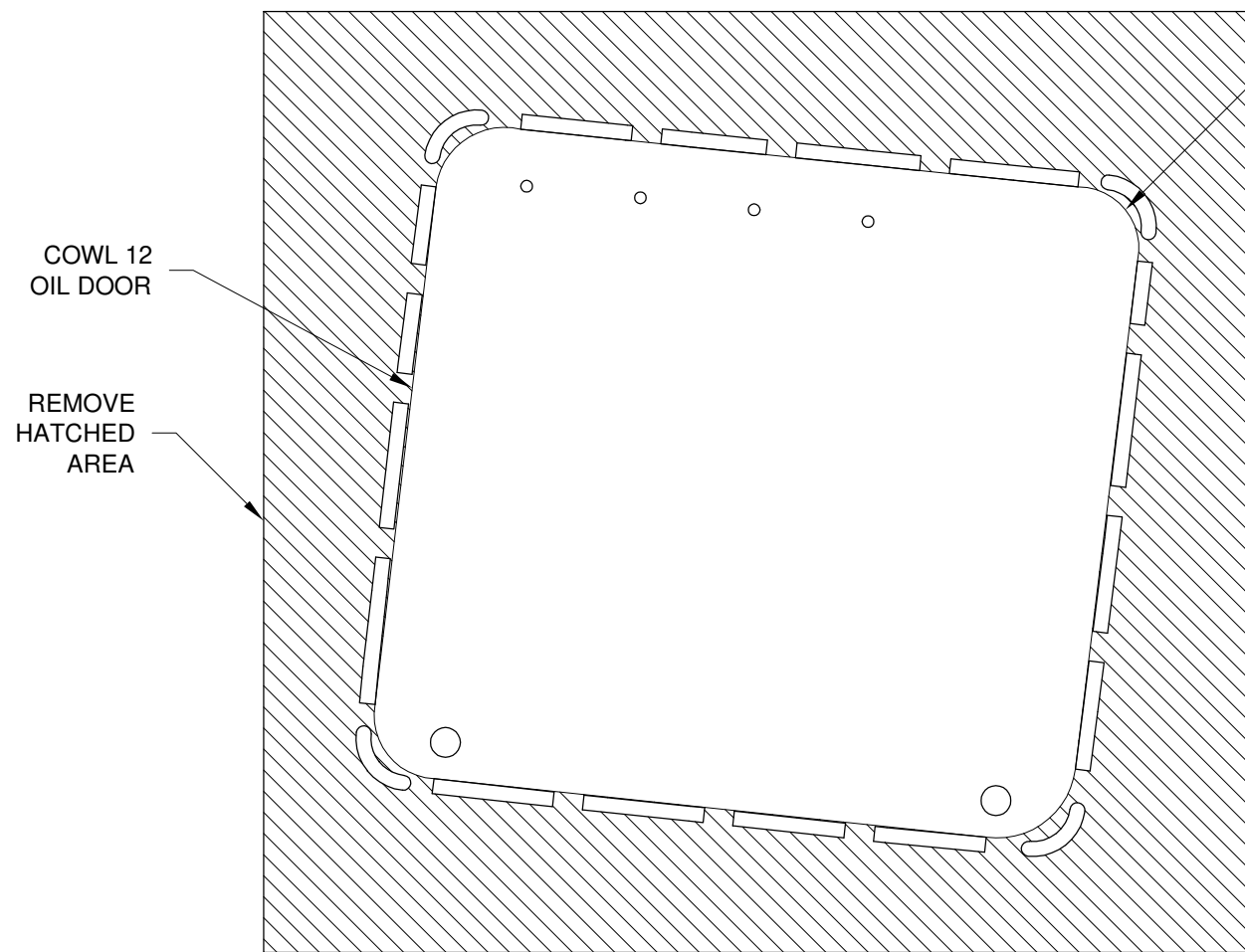


FIGURE 1: SEPARATING THE OIL DOOR (SHOWN FLAT)

NOTE FINISHED CORNERS DO NOT MATCH PUNCHED HOLES

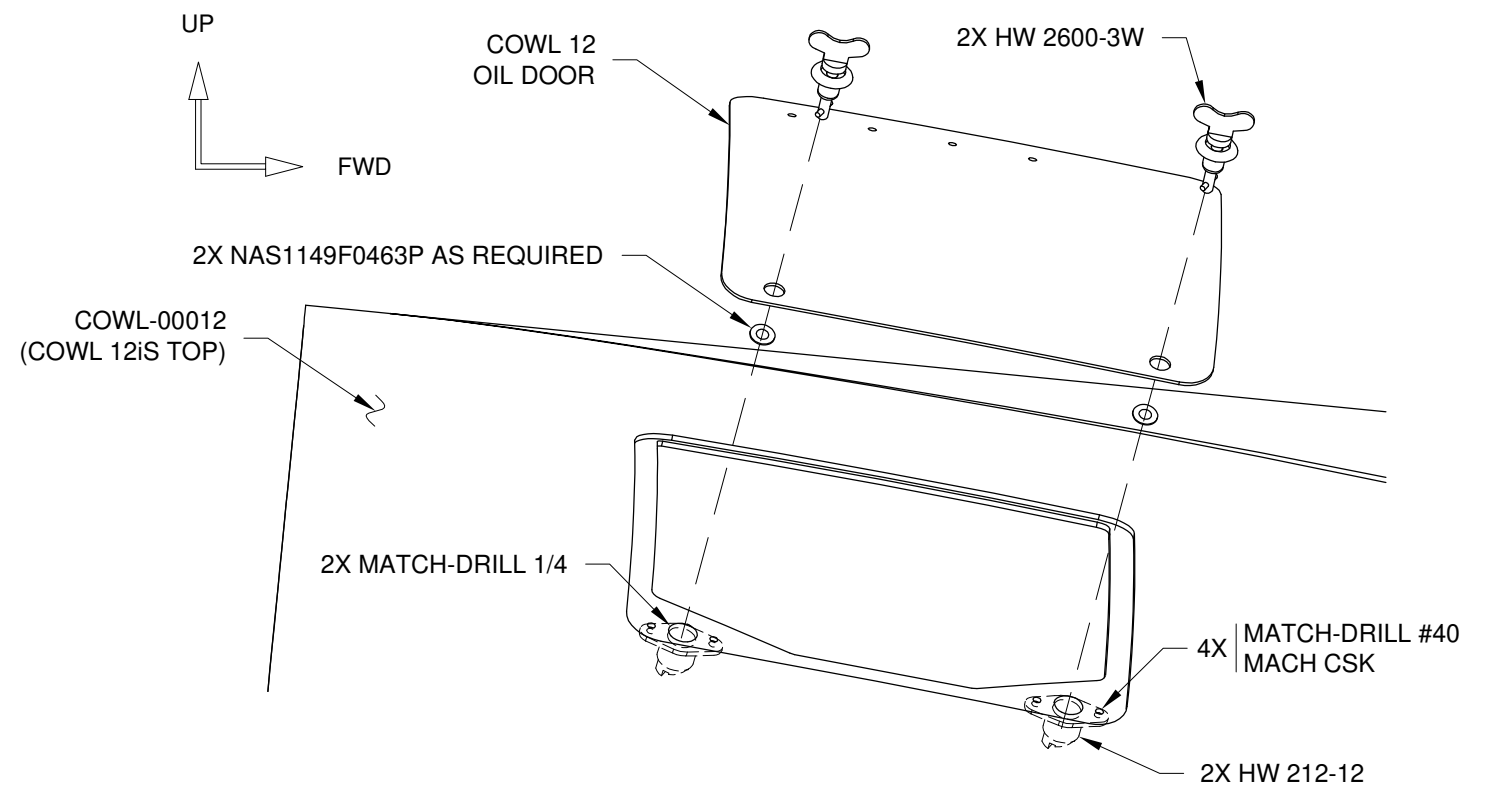
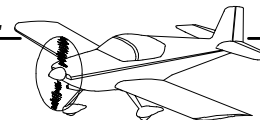


FIGURE 3: INSTALLING THE OIL DOOR CAMLOCS



**Step 1:** Use a step drill to enlarge the 1/4 camloc holes in the top cowl to 1/2. **DO NOT** enlarge the holes in the COWL 12 OIL DOOR. Keep the drill centered on the holes while drilling.

**Step 2:** Rivet the camloc receptacles to the top cowl as shown in Figure 1.

**Step 3:** Trim BUSHING TFI-0304-04 to 3/16" as shown in Figure 2.

**Step 4:** Attach the COWL-00008B lugs to the COWL-00008A gooseneck as shown in Figure 3. **DO NOT** fully torque the nuts: the lugs must be allowed to rotate.

**NOTE:** If desired, delay installation of the camloc retaining washers until after the cowl has been painted.

**Step 5:** Insert the camloc fasteners into the COWL 12 OIL DOOR.

**Step 6:** Cleco the COWL-00008A gooseneck to the COWL 12 OIL DOOR and attach the oil door to the top cowl using the camloc fasteners.

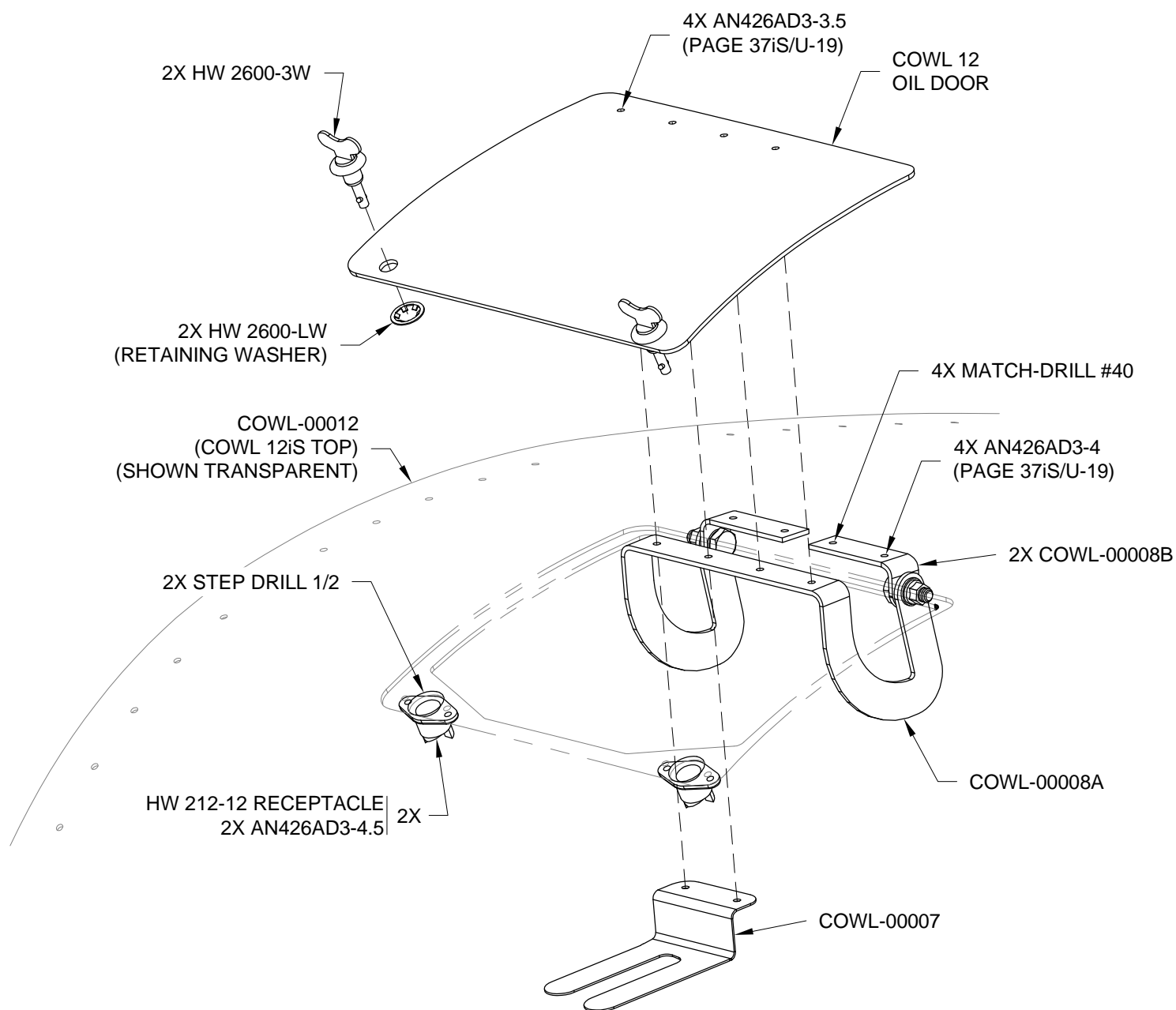
**Step 7:** Shim the forward COWL-00008B lug with a .020 in. [0.5 mm] thick spacer or as required. A permanent shim may be required in order to ensure smooth operation and tight closed position of the oil door.

**Step 8:** Rotate the COWL-00008B lugs until they lie flush against the inner surface of the top cowl.

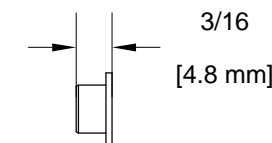
**Step 9:** Match-Drill #40 the holes in the COWL-00008B lugs into the top cowl. Cleco each hole as it is drilled.

**Step 10:** Verify that there is no interference with the top cowl when opening/closing the COWL 12 OIL DOOR. Modify the top cowl as required.

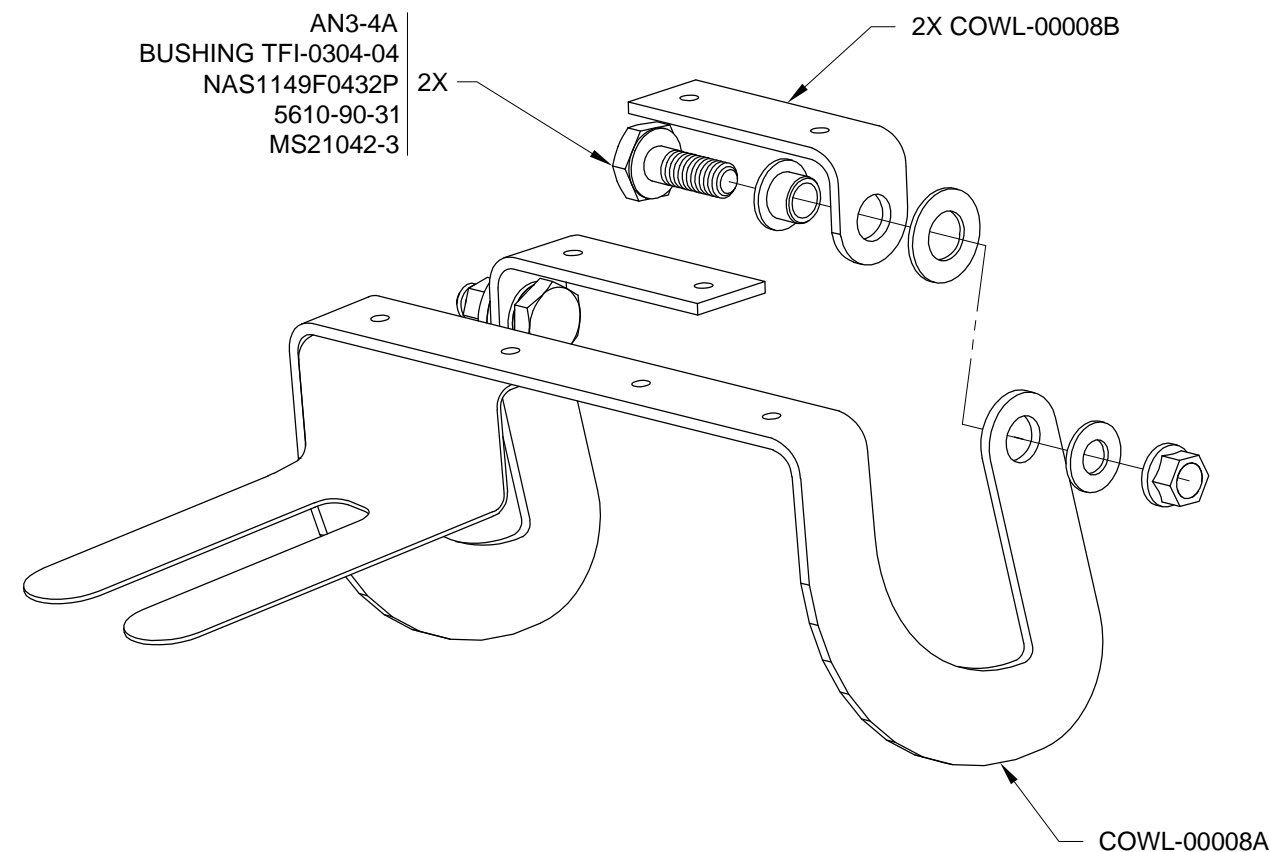
**Step 11:** Detach the COWL 12 OIL DOOR and COWL-00008B lugs from the top cowl.



**FIGURE 1: INSTALLING THE OIL DOOR HINGE**



**FIGURE 2: TRIMMING HINGE BUSHING**



**FIGURE 3: OIL DOOR HINGE HARDWARE**



**Step 1:** Install the COWL 12iS BOTTOM on the fuselage.

**Step 2:** Determine where the bent ends of the F-12116-L-1 & -R-1 hinge pins contact the firewall and apply RTV sealant to the firewall in those areas to prevent the pin from chafing.

**Step 3:** Machine countersink the nutplate rivet holes in the F-01285B-2.

**Step 4:** Rivet the nutplate to the F-01285B-2 as shown in Figure 1.

**Step 5:** Remove the middle WD-1201-1 attach bolt and then use it to install the F-01285B-2 as shown in Figure 1.

**Step 6:** Bend the F-01285-1 until it matches the contour of the bottom cowl.

**Step 7:** Slip the F-01285-1 around the WD-1201-1 and between the F-01285B-2 and the bottom cowl.

**Step 8:** Attach the F-01285-1 to the F-01285B-2 as shown in Figure 1. Align the F-01285-1 with the nose gear cutout and aft edge of the bottom cowl. Clamp the F-01285-1 to the bottom cowl.

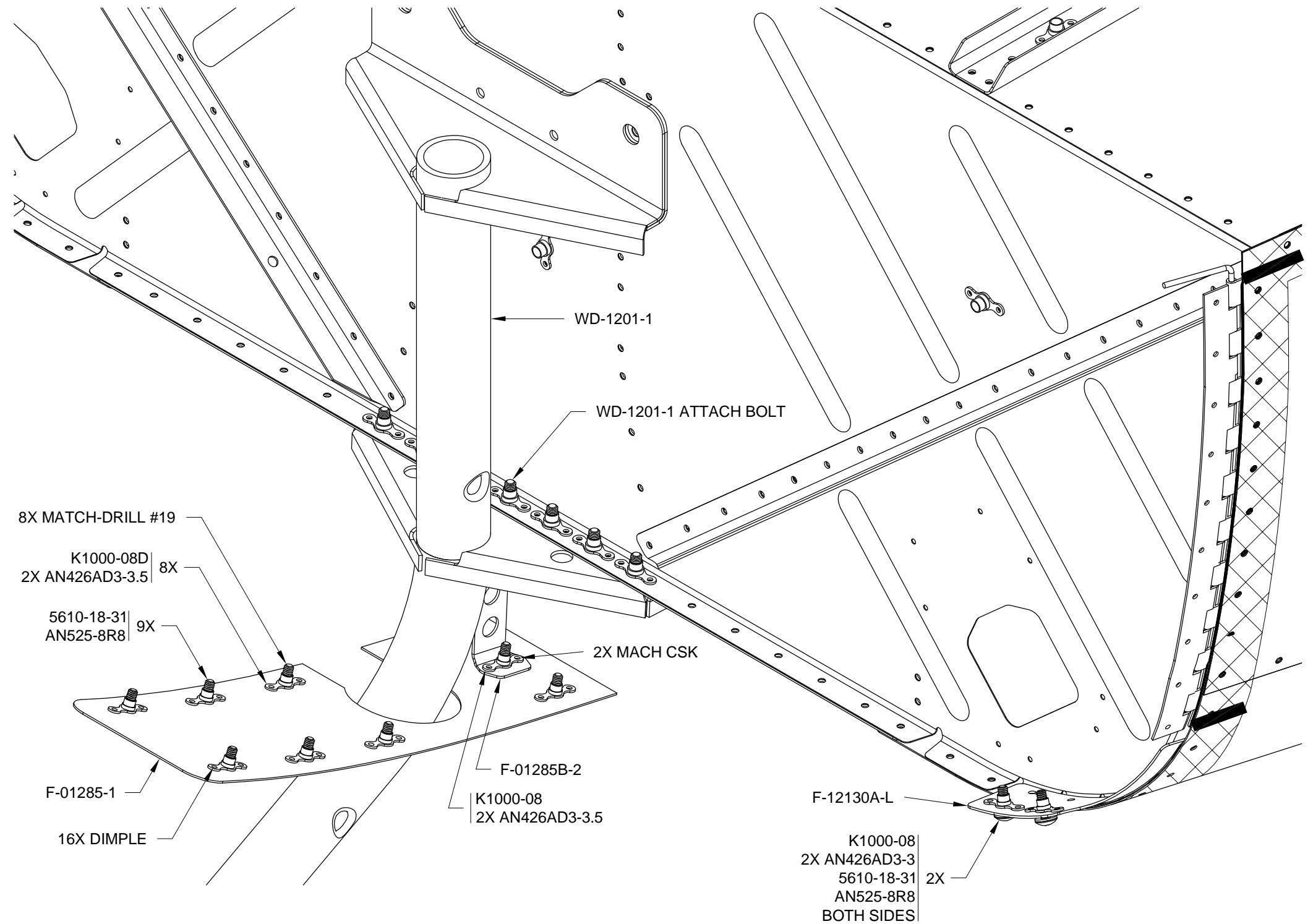
**Step 9:** Match-Drill #19 the nutplate screw holes in the F-01285-1 into the bottom cowl. To maintain alignment, insert a screw from the top of each drilled hole before match-drilling the next. Remove the bottom cowl if/as required to access the aft holes.

**Step 10:** Dimple the nutplate rivet holes in the F-01285-1 and then rivet the nutplates as shown in Figure 1.

**Step 11:** Match-Drill #19 the F-12130A-L & -R nutplate screw holes into the bottom cowl. See Figure 1.

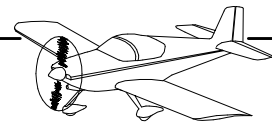
**Step 12:** Align the rivet holes in the nutplates with the undersized rivet holes in the F-12130A-L & -R, then final-drill #40 using the nutplates as guides. See Figure 1.

**Step 13:** Machine countersink the nutplate rivet holes in the F-12130A-L & -R and rivet the nutplates as shown in Figure 1.



**FIGURE 1: CLOSEOUT AND BOTTOM COWL ATTACH**  
(COWL 12iS BOTTOM NOT SHOWN)





**NOTE:** Except where noted, all steps on this page are for the 912iS installation of the older COWL 12iS TOP COWL.

**Step 1:** Remove material from the upper cowl louvers to open the cooling slots as shown in the detail view of Figure 1.

**NOTE:** Skip the remaining steps on this page if using the newer COWL-00012 RV-12iS TOP COWL.

**Step 2:** If required, trim the COWL-00009-L & -R to 1 in. [25.4 mm] larger than their joggles as shown in the detail view of Figure 1.

**Step 3:** Place the COWL-00009-L & -R inside the COWL 12iS TOP cutouts and verify proper fit. Remove material from the cutouts as required.

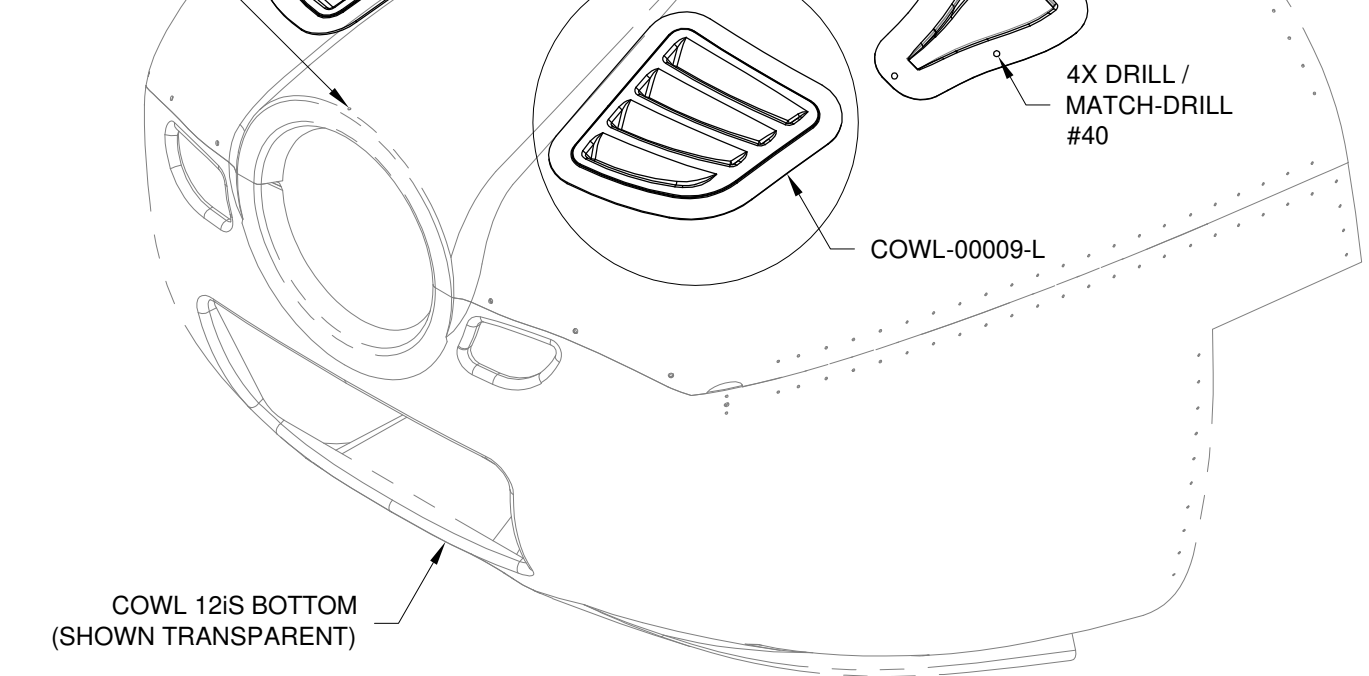
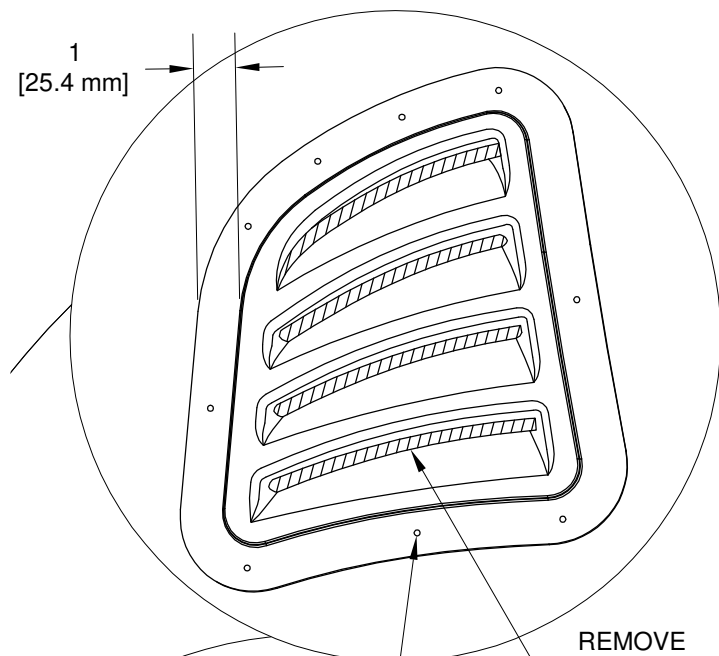
**Step 4:** Drill #40 the COWL-00009-L & -R as shown in the detail view of Figure 1.

**Step 5:** Secure the COWL-00009-L & -R to the top cowl with tape and then match-drill #40 the holes into the top cowl. Cleco each hole before drilling the next.

**Step 6:** Roughen the COWL-00009-L & -R and cowl mating surface with 80-grit sandpaper. Clean the roughened areas with isopropyl alcohol and let them dry.

**Step 7:** Coat the clecos with a release agent (e.g. Boelube, automotive wax, etc.).

COWL-00009-R  
ALUMINUM ANGLE HOLE



**FIGURE 1: iS COWL INLETS**  
(COWL SHOWN TRANSPARENT)

**NOTE:** If required, review Section 5.18 MIXING COTTON FLOX WITH EPOXY RESIN.

**Step 8:** Apply a layer of epoxy/flox to the roughened areas of the COWL-00009-L & -R.

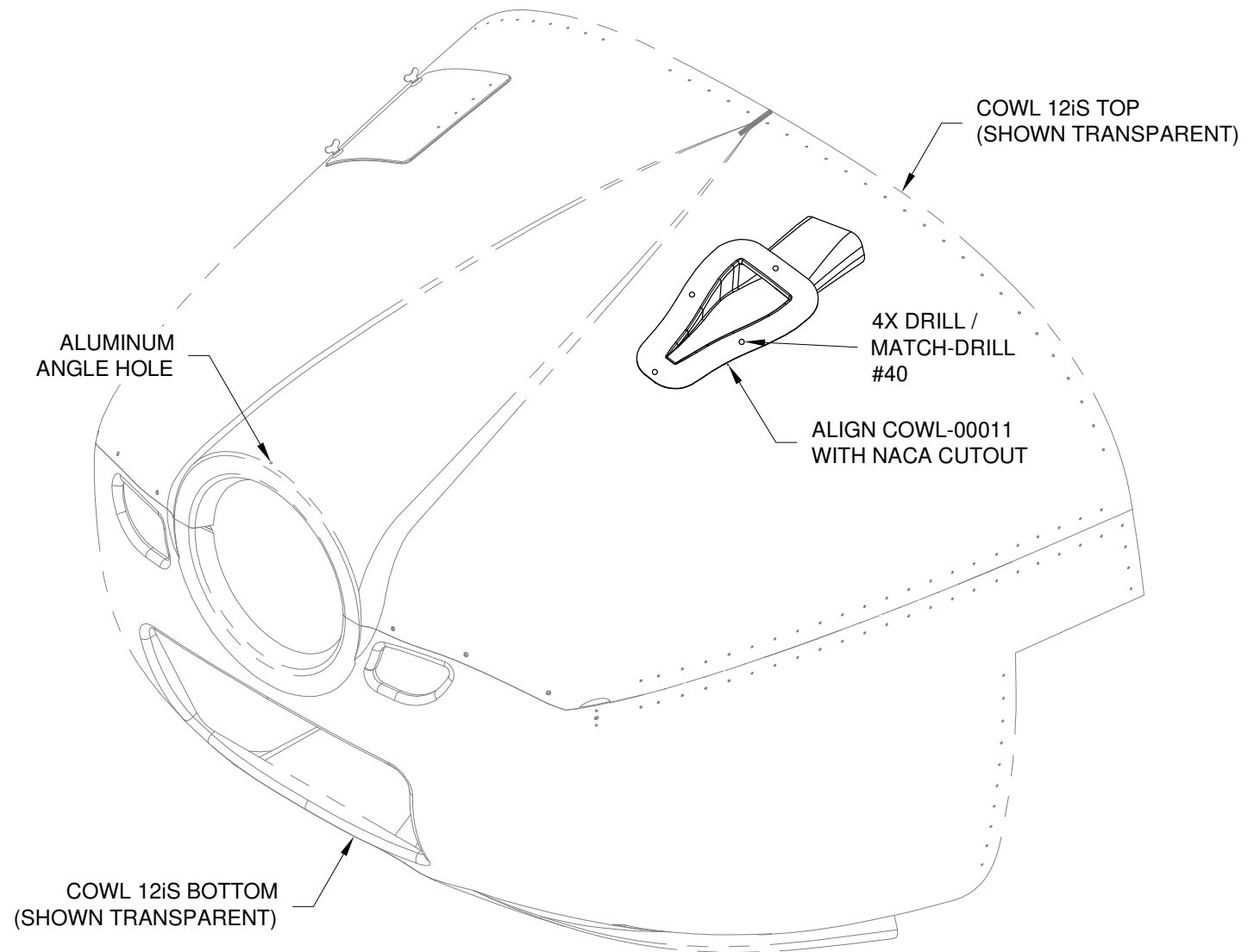
**Step 9:** Cleco the COWL-00009-L & -R to the top cowl. Install the top and bottom cowls on the fuselage and allow the epoxy/flox to cure before removing.

**Step 10:** Fill the cleco holes with epoxy/flox. Allow the epoxy/flox to fully cure, then sand away any excess from the outer surface of the cowl.

**Step 11:** Repeat Steps 3 through 10 for the COWL-00011 as shown in Figure 1. Ensure that the COWL-00011 aligns with the voltage regulator on the firewall prior to Step 5.

**Step 12 (iS and ULS):** Repeat Step 10 for the hole in the top cowl that was used for the aluminum angle.

**Step 13 (ULS):** Work through the sequence detailed in Steps 3 through 10 for the COWL-00011 as shown in Figure 2. Ensure that the COWL-00011 aligns with the voltage regulator on the firewall prior to Step 5.



**FIGURE 2: ULS COWL INLETS**  
(COWL SHOWN TRANSPARENT)



**NOTE: The instructions on this page are for the iS cowl, except for installation of the VENT-00003 which is for both the iS and ULS cowls.**

**Step 1:** Center FF-00120 about the opening on the top of COWL-00006 as shown in Figure 1. Mark the screw attach holes onto COWL-00006. Check that the holes have even edge distance about the opening then match-drill #19 the screw attach holes into COWL-00006.

**Step 2:** Using a nutplate as a guide, match-drill the nutplate rivet attach pattern at each screw location into the COWL-00006.

Drill #30 a drain hole approximately beneath the aft nutplate screw hole as shown in Figure 1. "Deburr" the hole.

Machine countersink the rivet attach holes and rivet nutplates to the top of COWL-00006.

**Step 3:** Temporarily attach FF-00120 to COWL-00006 for safe keeping until the Powerplant Kit installation.

**Step 4:** Attach the COWL 12iS BOTTOM to the fuselage. Position the inside faces of COWL-00006 to best match the engine air inlet NACA opening. Use a straight edge as shown in Section A-A. Drill #40 then cleco several locations around the perimeter flange of COWL-00006 into the COWL 12iS BOTTOM.

Use a similar method to position VENT-00003 about the cabin heat inlet NACA opening then drill #40 the flange to the COWL 12iS BOTTOM.

**Step 6:** Remove material from the outer diameter of the VENT-00003 until a SCAT tube can easily slide over the circular flange.

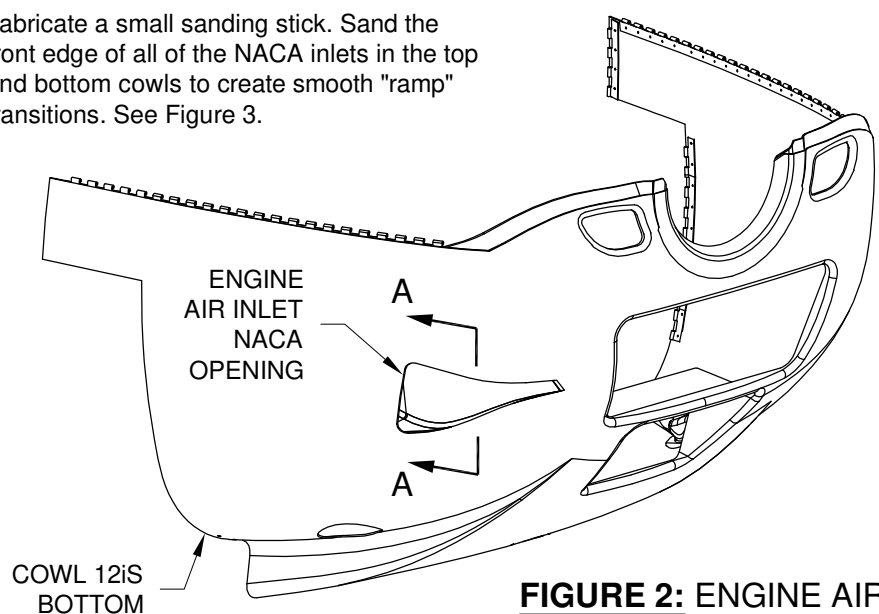
**Step 7:** Mix a flox/epoxy mixture. See Section 5.18 Mixing Cotton Flox With Epoxy Resin. Remove COWL-00006 and VENT-00003, apply a liberal amount of flox/epoxy mixture to each flange then cleco both parts to the COWL 12iS BOTTOM. Remove excess flox/epoxy mixture inside the cowling around the edges of the parts.

Add flox/epoxy mixture to the groove between the parts and the cowling as needed. Cover this groove with clear packing tape. Use a popsicle stick to force out the extra flox/epoxy mixture. See Section A-A of Figure 2.

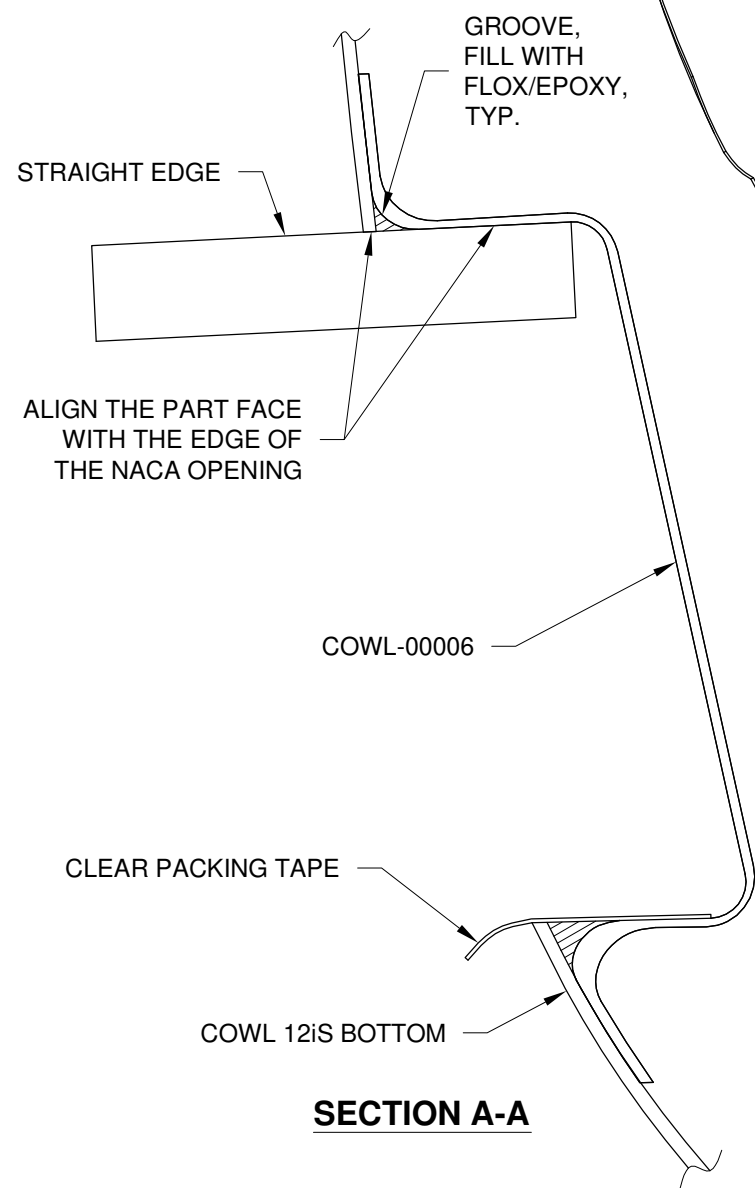
Install the top cowl and leave both the top and bottom cowls attached to the fuselage until the flox/epoxy is fully cured.

**Step 8:** Remove the clear packing tape then final sand the edges of each opening.

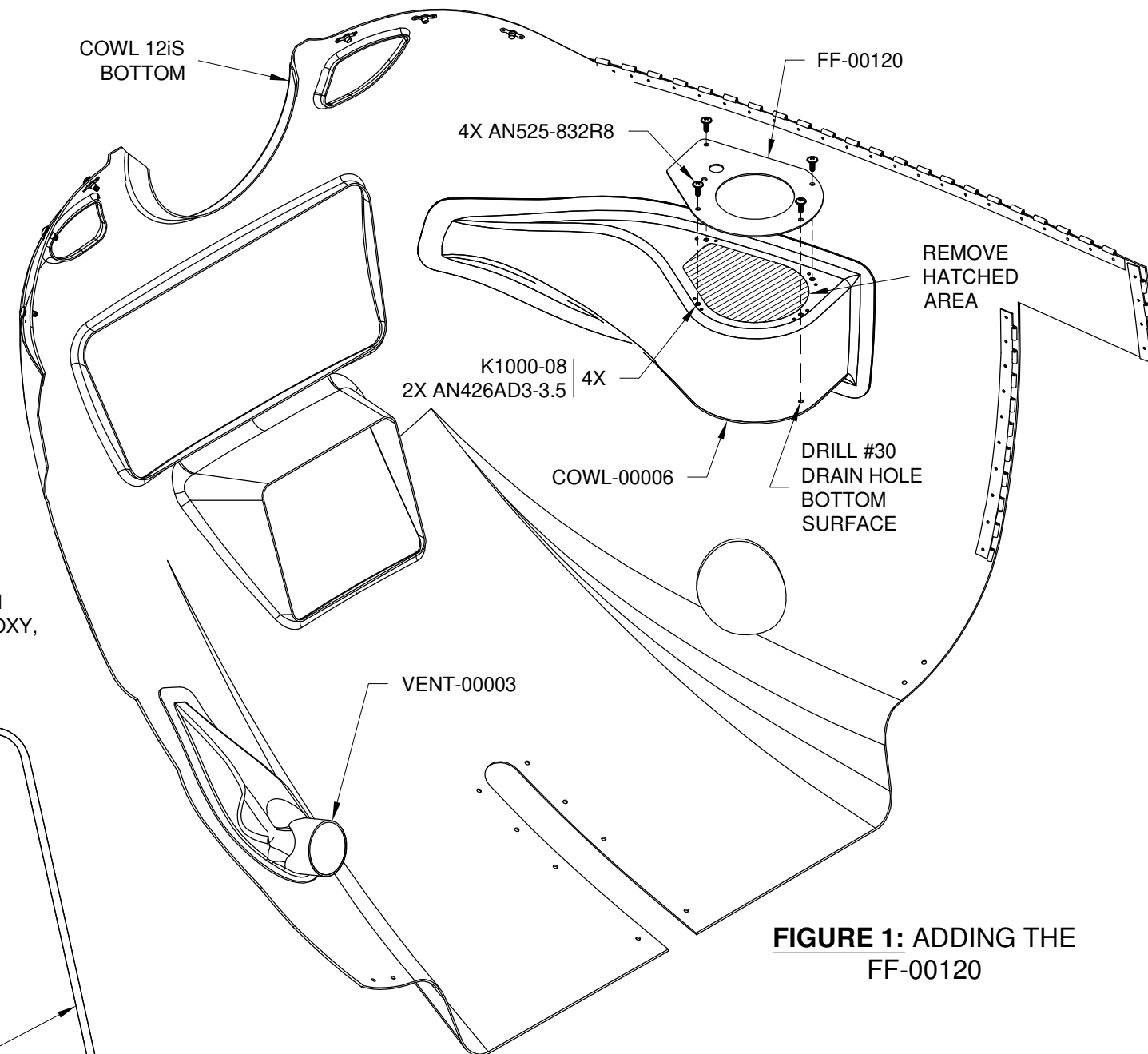
Fabricate a small sanding stick. Sand the front edge of all of the NACA inlets in the top and bottom cowls to create smooth "ramp" transitions. See Figure 3.



**FIGURE 2: ENGINE AIR INLET CUTOUT**



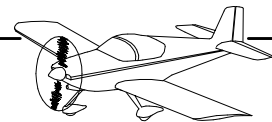
**SECTION A-A**



**FIGURE 1: ADDING THE FF-00120**



**FIGURE 3: FINISHED ENGINE AIR INLET**



**Step 1:** Apply EA EXHST/COWL SHIELD to the COWL 12iS BOTTOM as shown in Figure 1. Remove the adhesive backing as you go (not all at once).

**Step 2:** Rub the heat shield with a stiff plastic squeegee or hard roller to work the inevitable wrinkles and bubbles to an edge. Stubborn bubbles can be popped with a needle.

**Step 3:** Seal the edges of the heat shield with a thin layer of epoxy resin.

**Step 4:** Place the top and bottom cowl on the fuselage and insert all of the hinge pins and screws.

**Step 5:** Verify that a 1/32 in. [0.8 mm] to .050 in. [1.3 mm] gap exists between the top and bottom cowls and between the cowls and the fuselage skins. Remove additional material from the top and bottom cowls as required to create a uniform gap.

**Step 6:** Remove material from around the perimeter of the COWL 12 OIL DOOR until it fits the oil door recess in the top cowl (i.e. until there is a uniform gap between the perimeter and the recess).

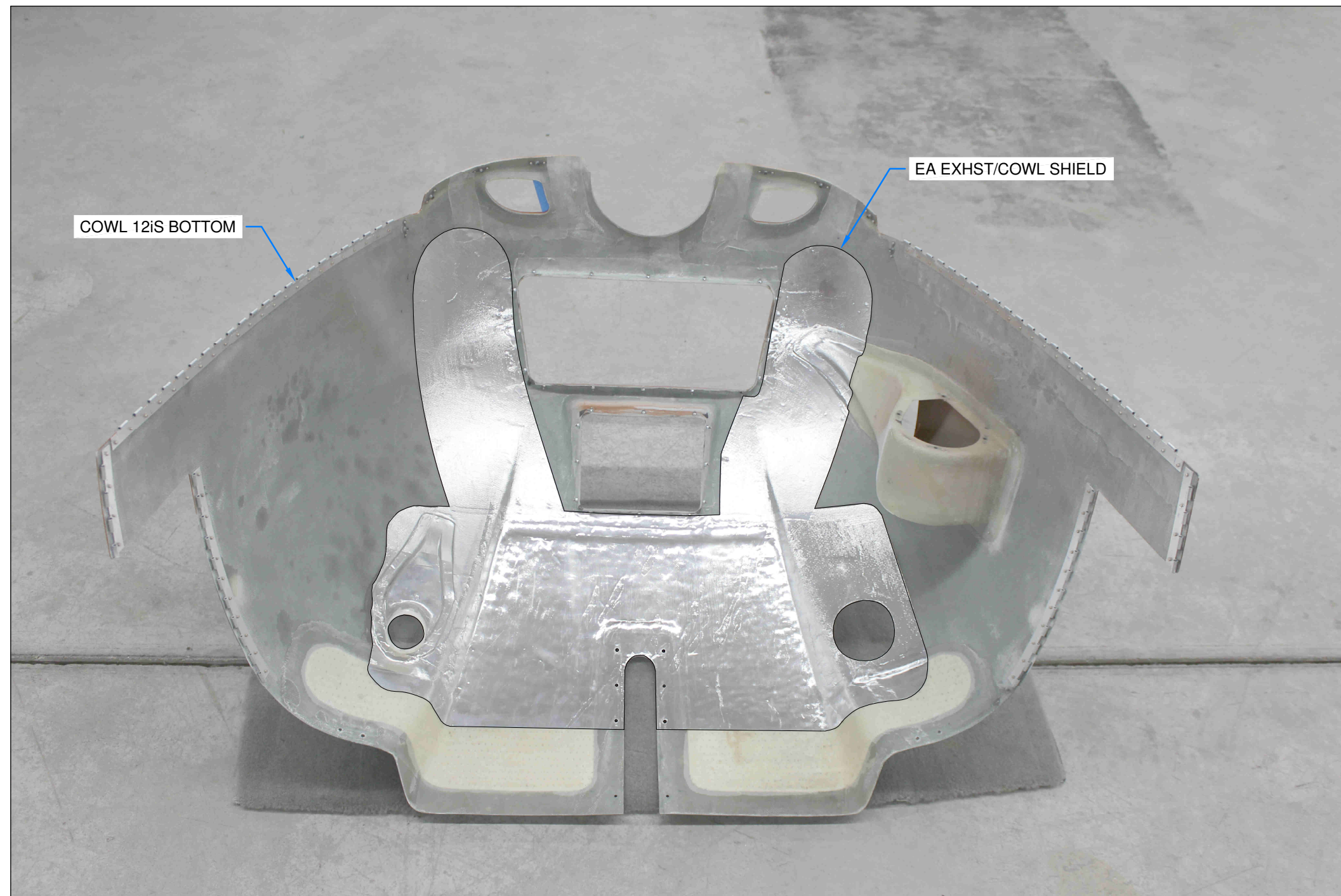
**Step 7:** Machine countersink the COWL 12 OIL DOOR and the COWL-00008B lug holes in the top cowl.

**Step 8:** Detach the COWL-00008B lugs from the COWL-00008A gooseneck as required. Rivet the lugs to the top cowl as shown in Figure 1 on Page 37iS/U-15.

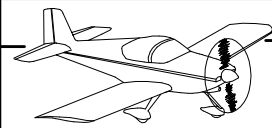
**Step 9:** Rivet the COWL-00008A gooseneck and COWL-00007 to the COWL 12 OIL DOOR as shown in Figure 1 on Page 37iS-15.

**Step 10:** Attach the COWL-00008A gooseneck to the COWL-00008B lugs as shown in Figure 2 on Page 37iS/U-15. Tighten the hardware only until the oil door will stay open on its own (with the oil cap in COWL-00007).

**Step 11:** Remove the tape from the forward edge of the fuselage skins.



**FIGURE 1: BOTTOM COWL HEAT SHIELD**  
(iS COWL SHOWN)



**NOTE:** Complete this page after the radiator and oil cooler are installed in Section 50iS/U.

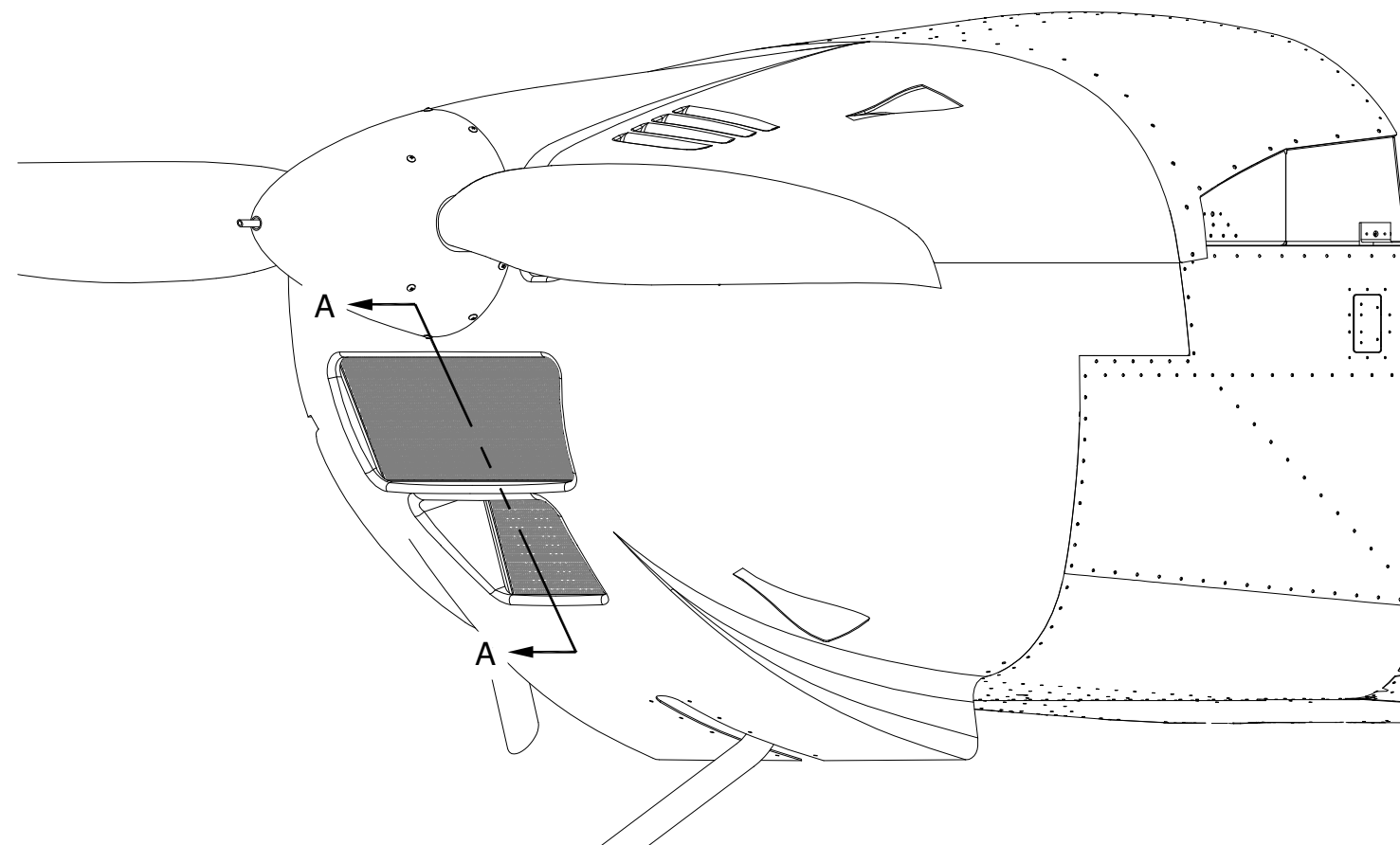
**CAUTION:** The lower cowl openings will be close to the radiator and oil cooler core (finned area) before trimming. Use caution to prevent damage to the radiator or oil cooler core.

**Step 1:** With the EA RV-12iS RADIATOR and the EA RV-12iS OIL COOLER installed on the engine, attach the COWL 12iS BOTTOM to the fuselage as shown in Figure 1.

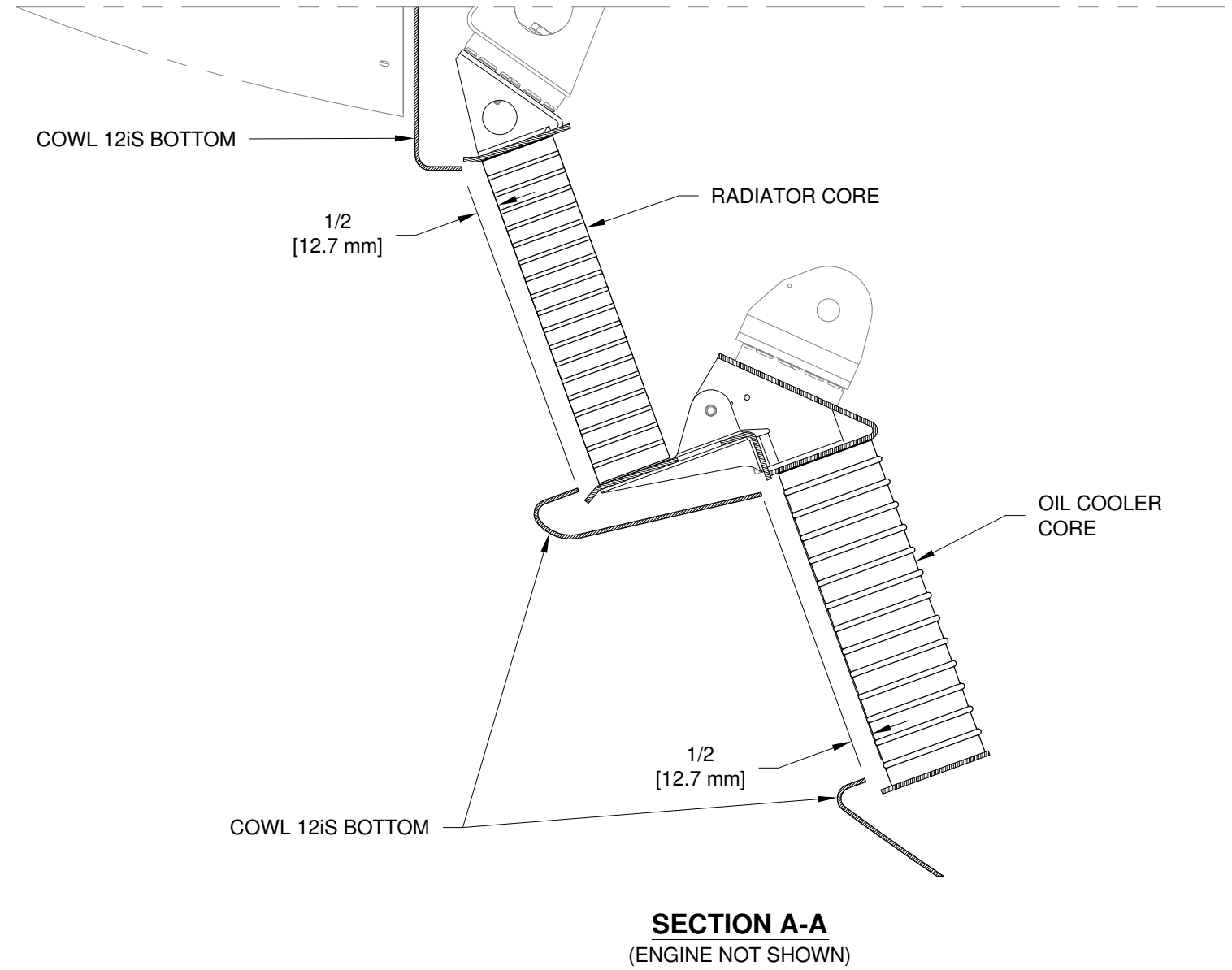
**Step 2:** Make a mark around the openings in the COWL 12iS BOTTOM at the distances shown in Section A-A, measuring from the forward face of the radiator core and oil cooler core.

**Step 3:** Remove the COWL 12iS BOTTOM. Trim the radiator and oil cooler openings to the marks.

End of Section



**FIGURE 1: BOTTOM COWL OPENING TRIM**  
(iS COWL SHOWN)



**SECTION A-A**  
(ENGINE NOT SHOWN)