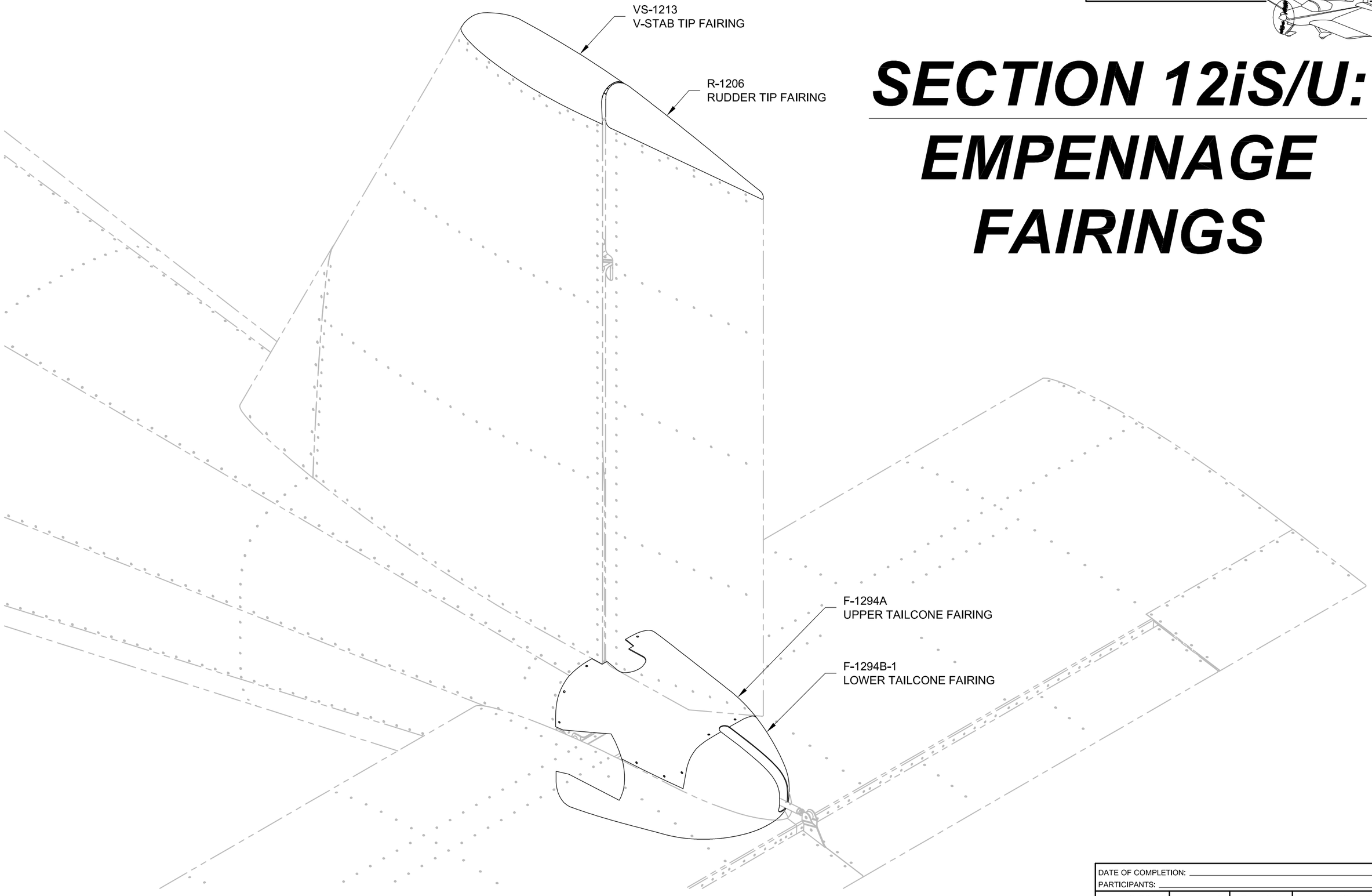
SECTION 12iS/U: EMPENNAGE FAIRINGS



DATE OF COMPLETION: _____
PARTICIPANTS: _____

NOTE: Begin this section with the V-Stab, Rudder, Trim/Servo and Stabilator Assemblies removed from the Tailcone Assembly.

NOTE: Tools will dull rapidly when used on fiberglass. Set aside a specific set of tools for use on fiberglass only. See Section 5T for more information on working with fiberglass.

Step 1: Ensure that the molded recessed area on both of the tip fairings has a square corner as shown in Figure 1. Use a razor blade or file to remove any material that may have been left from the mold.

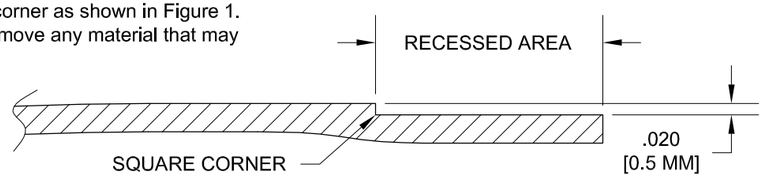


FIGURE 1:
VS-1213 AND R-1206 TIP
FAIRING MOLDED FLANGE

Step 2: Trim any extra material from the recessed area of the R-1206 per dimension given in Figure 2. Coarse 80 grit sandpaper on a wood block works well for this step.

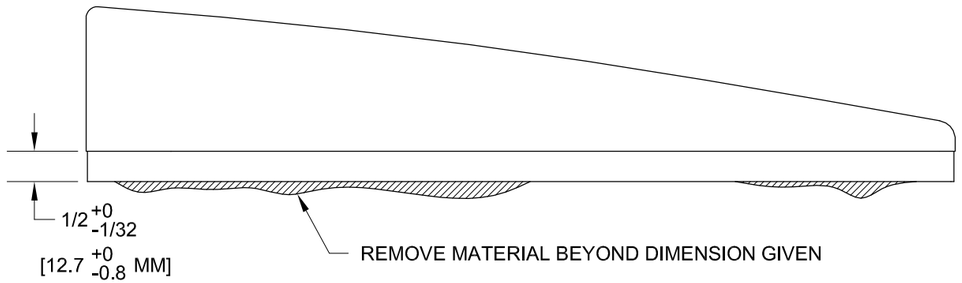


FIGURE 2:
R-1206 RUDDER TIP FAIRING

Step 3: Trim any extra material from the recessed area of the VS-1213 per dimensions given in Figure 3.

Step 4: Trim the VS-1213 near the aft scribe line as shown in Figure 3. Coarse 80 grit sandpaper on a cylindrical object works well for this step.

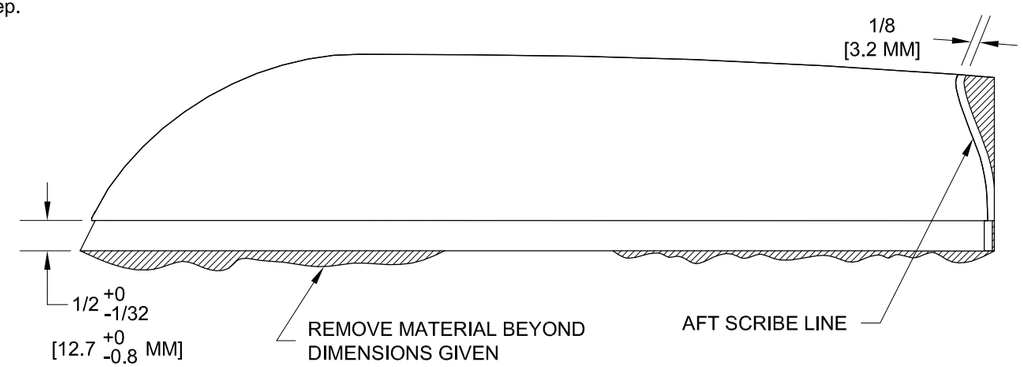


FIGURE 3: VS-1213 V-STAB TIP FAIRING

Step 5: Place the R-1206 onto the Rudder Assembly. The edge of the recessed area of the R-1206 must be flush against the entire top edge of the R-1201 Main Skin.

To resolve interference issues, recheck the recessed area measurement with the dimension given in Figure 2. Remove the minimum amount of material necessary within that dimension to achieve a flush fit to the top edge of the main skin.

Step 6: Match-Drill #30 the holes from the R-1201 into the R-1206 as shown in Figure 4. Cleco each hole before drilling the next.

Remove, clean and deburr, then cleco in place.

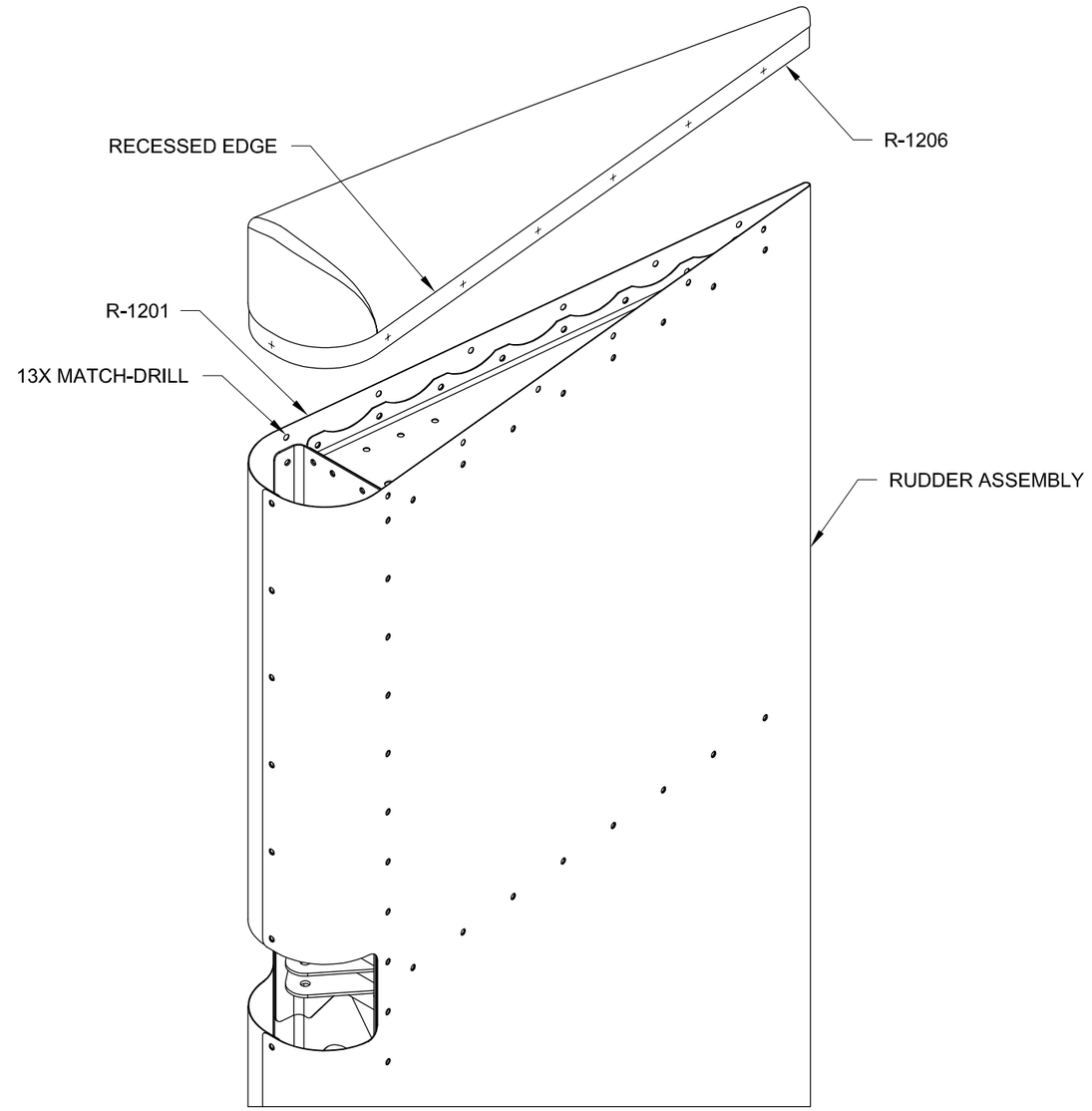


FIGURE 4:
RUDDER TIP FAIRING

Step 1: Place the VS-1213 onto the V-Stab Assembly. The edge of the recessed area of the VS-1213 must be flush against the entire top edge of the VS-1201 Main Skin as shown in Figure 1.

To resolve interference issues, recheck the recessed area measurement with the dimension given on Page 12iS/U-02, Figure 3. Remove the minimum amount of material necessary within that dimension to achieve a flush fit to the top edge of the VS-1201.

Step 2: With the VS-1213 in place, Match-Drill #30 the holes from the VS-1201 into the VS-1213 as shown in Figure 1. Cleco each hole before drilling the next.

Step 3: Mark the aft edges of the VS-1213 even with the aft edges of the VS-1201 as shown in Figure 1. Remove the VS-1213 and trim/sand the aft edges to be flush with the VS-1201.

Step 4: Make a smooth transition from the surface of the VS-1213 to the surface of the VS-1201. Remove the VS-1213, sand the surface of the fairing where necessary, then reinstall. Check and repeat until the transition is smooth.

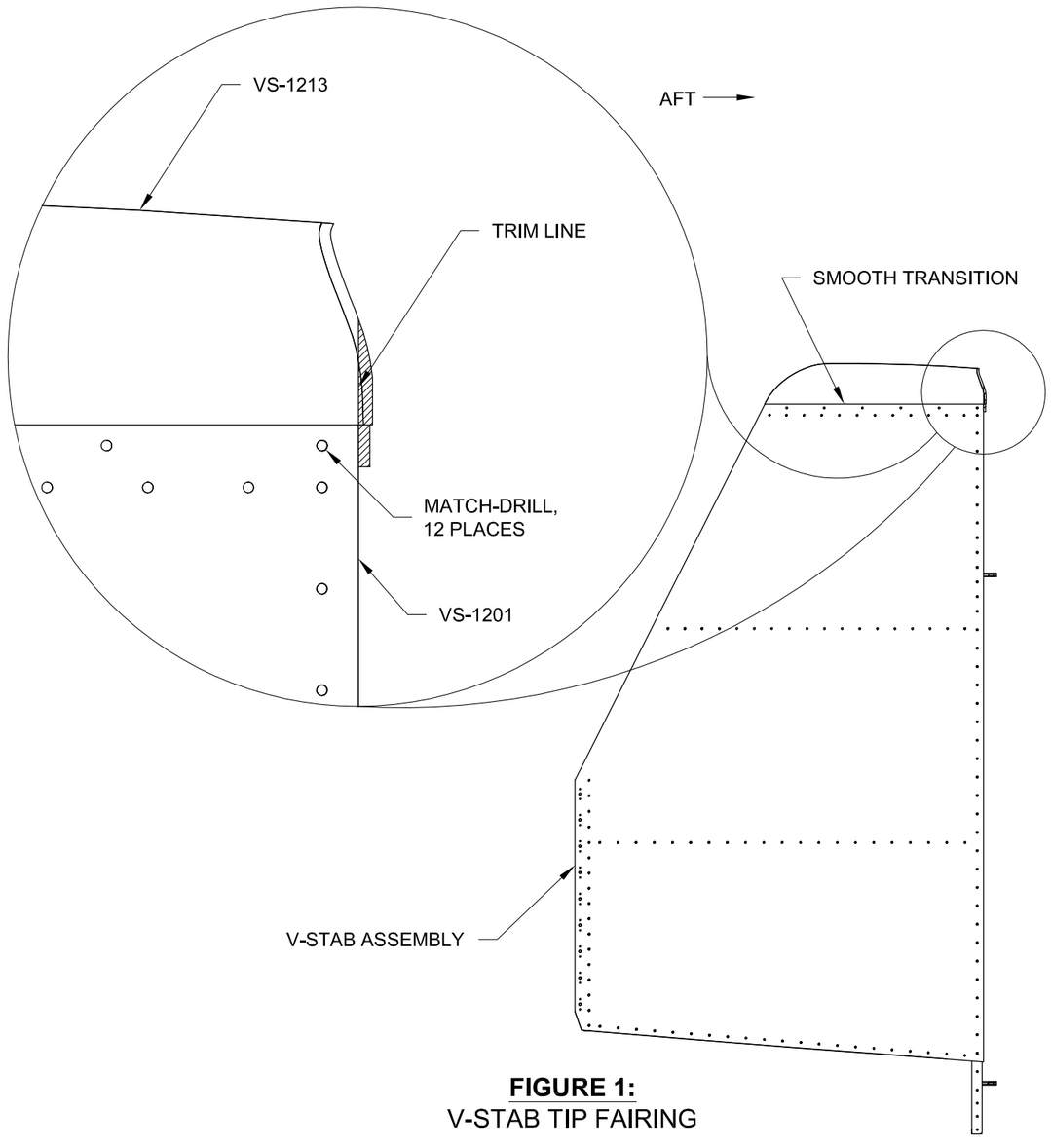


FIGURE 1:
V-STAB TIP FAIRING

Step 5: Temporarily attach the Rudder Assembly to the V-Stab Assembly. Refer to Section 11iS/U.

Step 6: Place the VS-1213 in position as shown in Figure 2. Mark the aft edge of the VS-1213 to indicate any material that is within 1/8 in. [3.2 mm] of the Rudder Assembly. Remove the fairing, then trim to the marked areas to provide clearance for the Rudder Assembly. Repeat, as necessary, to achieve 1/8 in. to 1/4 in. [3.2 to 6.4 mm] clearance throughout the Rudder Assembly travel.

Smooth the trimmed edge with sandpaper, finish sand the entire VS-1213 and wipe away loose material. Re-cleco in place.

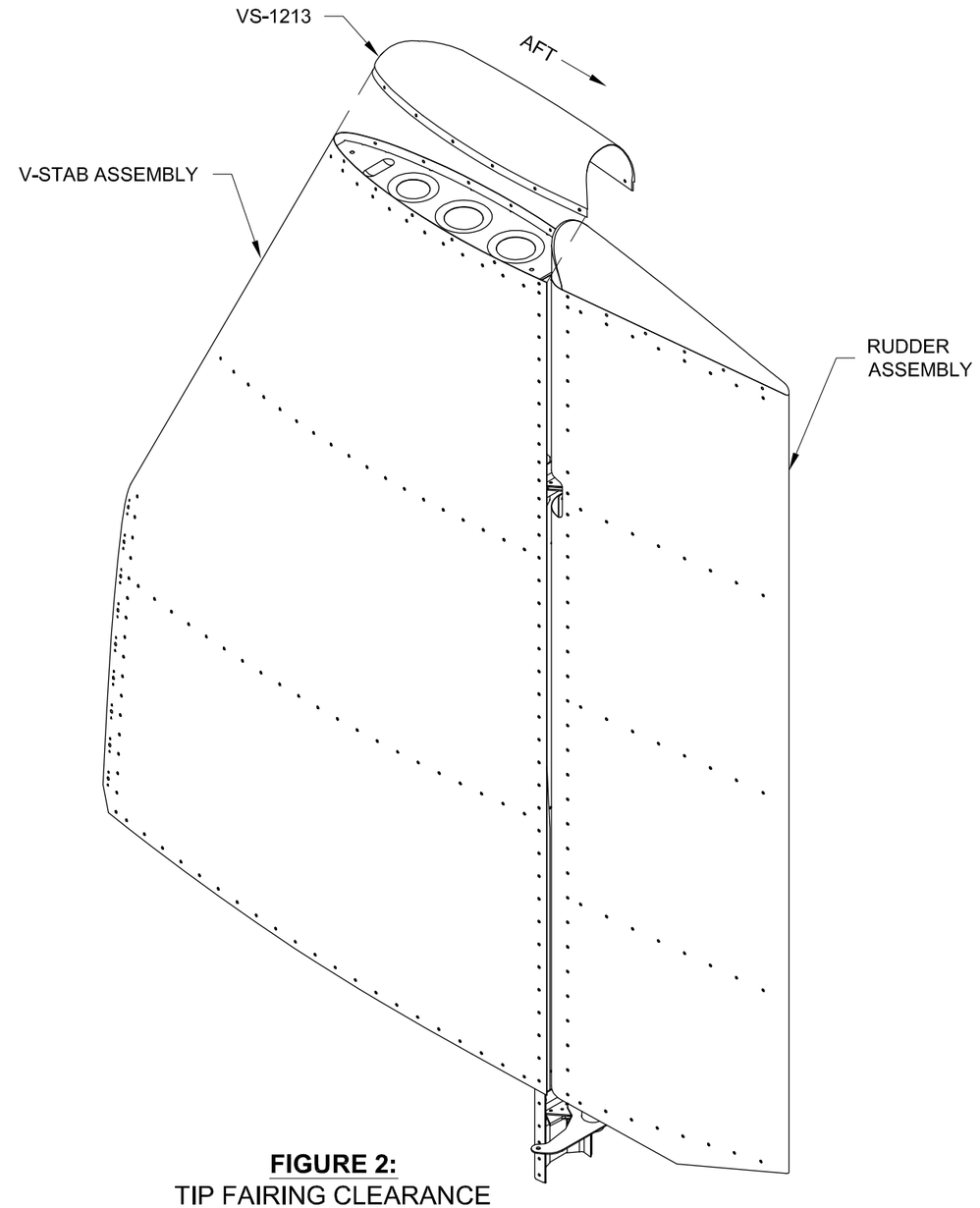


FIGURE 2:
TIP FAIRING CLEARANCE

Step 1: Remove the Rudder Assembly from the V-Stab Assembly.

Step 2: Rivet the VS-1213 to the V-Stab Assembly using the rivets called out in Figure 1.

Step 3: Rivet the R-1206 to the Rudder Assembly using the rivets called out in Figure 1.

NOTE: For Step 4 refer to Section 11iS/U.

Step 4: Install the V-Stab Assembly to the Tailcone Assembly.

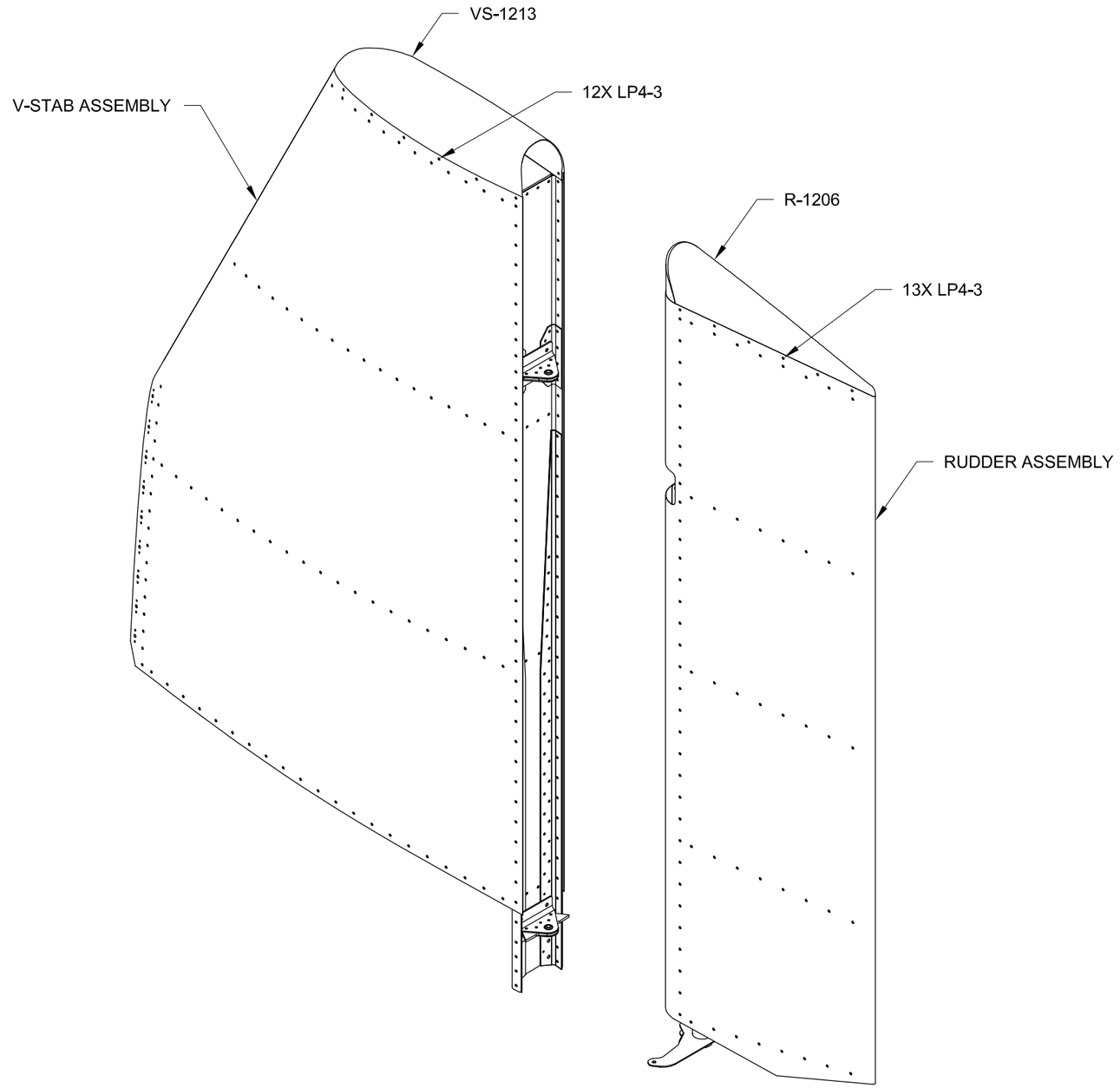


FIGURE 1:
TIP FAIRING INSTALLATION

NOTE: The F-1294A and F-1294B-1 Tailcone Fairings will arrive with the Finish Kit.

Step 1: Mark two lengths of masking tape per dimensions in Figure 1. One will be the 'AL', which will be for the upper left part of the tailcone. The other will be the 'BL', which will be for the lower left part of the tailcone. Use a pen that makes dark lines.

Mark two more pieces of masking tape as a mirror of the first two, label them 'AR' and 'BR' for the right side of the tailcone.

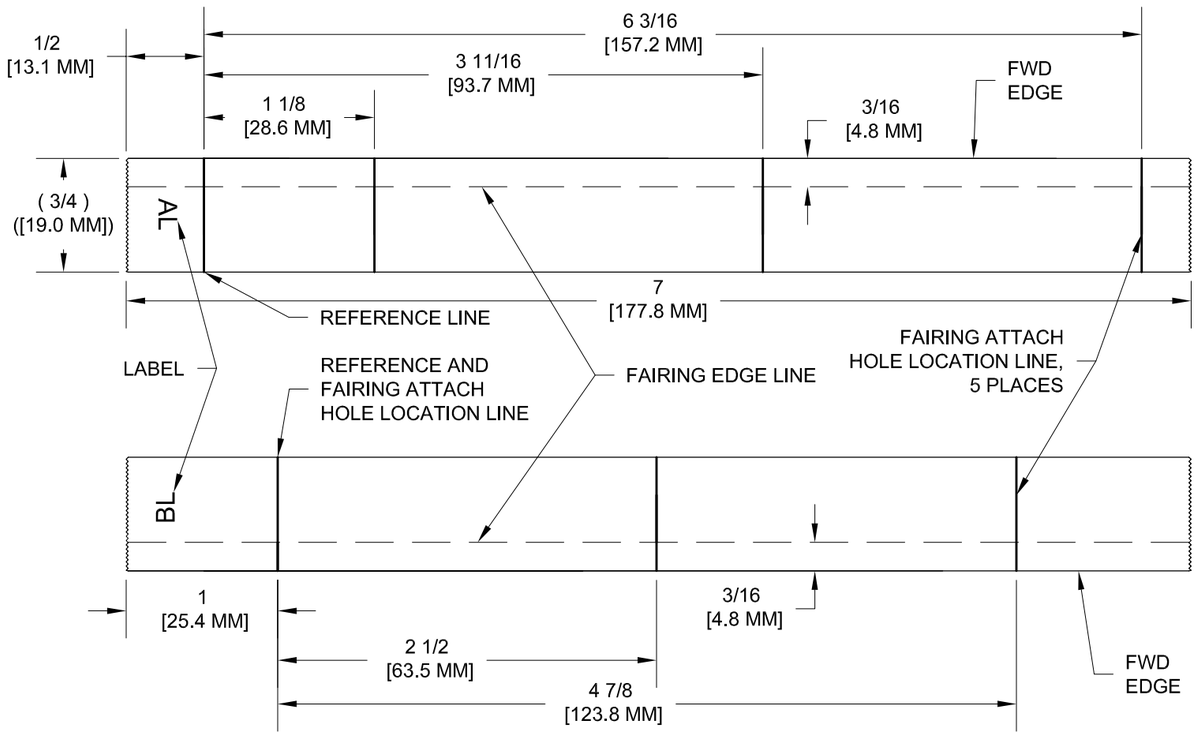


FIGURE 1:
MASKING TAPE MARKING
(NOT TO SCALE)

NOTE: The thin areas of the Tailcone Fairings can be trimmed using hand shears. The thicker areas of the upper and lower tailcone fairings can be trimmed using a hacksaw.

Step 2: Drill a hole using a step drill bit in the F-1294A as shown in Figure 2. Drill two holes in each side of the upper tailcone fairing at the locations shown in Figure 2. Place the perimeter of the hole as close to the scribe line as possible.

Step 3: Trim excess material from the F-1294A as shown in Figure 2. Cut close to the scribe line, then use a sanding block to finish the edge to the scribe line.

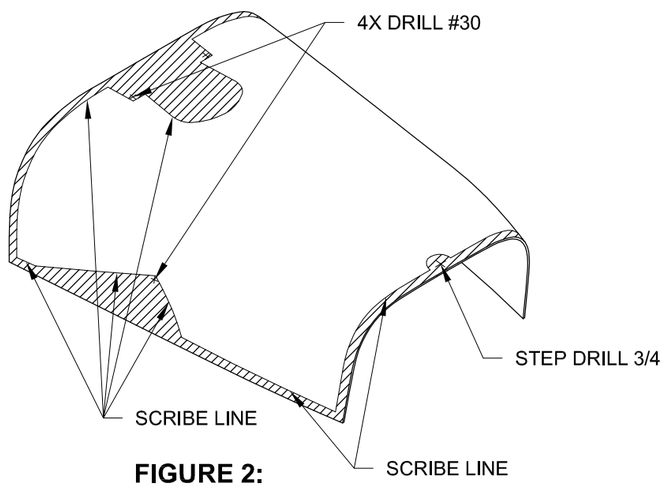


FIGURE 2:
TRIMMING THE F-1294A

Step 4: Drill two holes with a step drill bit in the F-1294B-1 as shown in Figure 3.

NOTE: Do not cut away the material between the two holes drilled in Step 4.

Step 5: Trim the excess material from the edges of the F-01294B-1 and as shown in Figure 3. Cut close to the scribe lines, then use a sanding block to finish the edge to the scribe line.

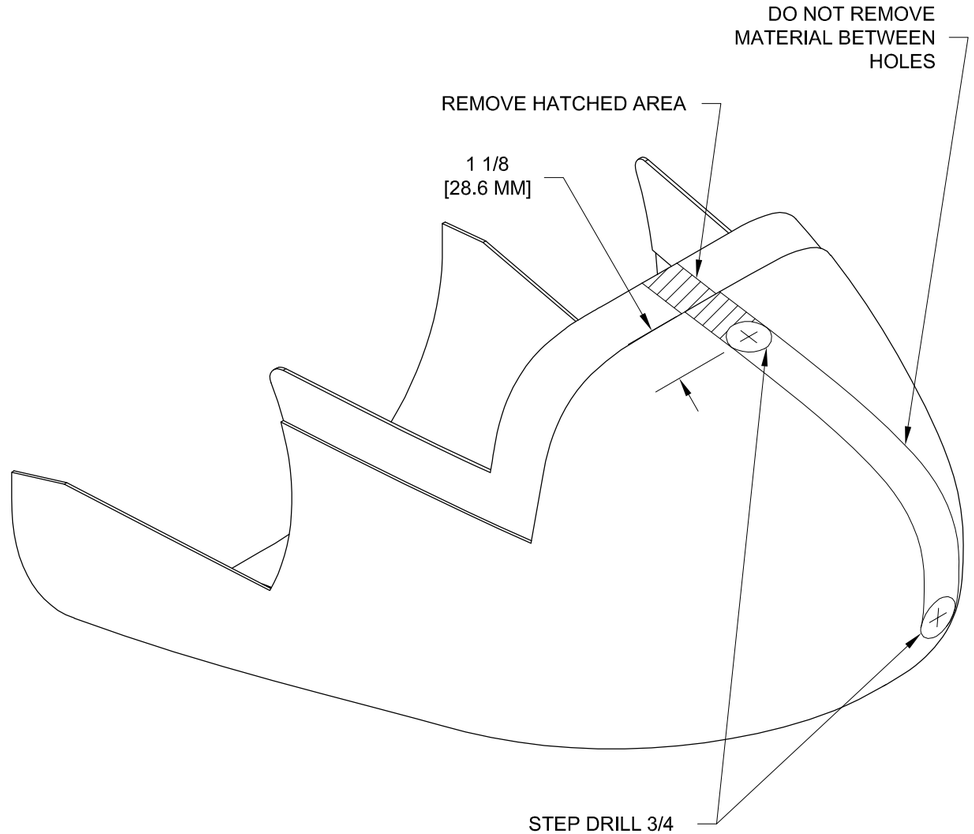


FIGURE 3:
TRIMMING THE F-1294B-1

Step 1: Place the forward end of the reference line of tape 'AL' on the lower edge of the F-1279-L Upper Corner Skin. Align the forward edge of the masking tape along the manufactured heads of the aft-most rivet pattern on the tailcone as shown in Figure 1. Gather wrinkles in the aft edge of the tape between the fairing attach hole marks.

Step 2: Place the forward end of the reference line of tape 'BL' on the lower edge of the F-1280-L Side Skin. Align the forward edge of the masking tape along the aft-most rivet pattern on the tailcone as shown in Figure 1. Gather wrinkles in the aft edge of the tape between the fairing attach hole marks.

Repeat Steps 1 and 2 on the right side of the Tailcone Assembly using tape 'AR' and 'BR'.

Step 3: Measure and mark the dimension given from the aft edge of the tailcone skins, at each fairing attach hole location as shown in Figure 1.

NOTE: Refer to Section 5C for part marking details.

Step 4: Extend the fairing attach hole location lines forward and make a mark at the dimension shown, at each fairing attach hole location as shown in Figure 1.

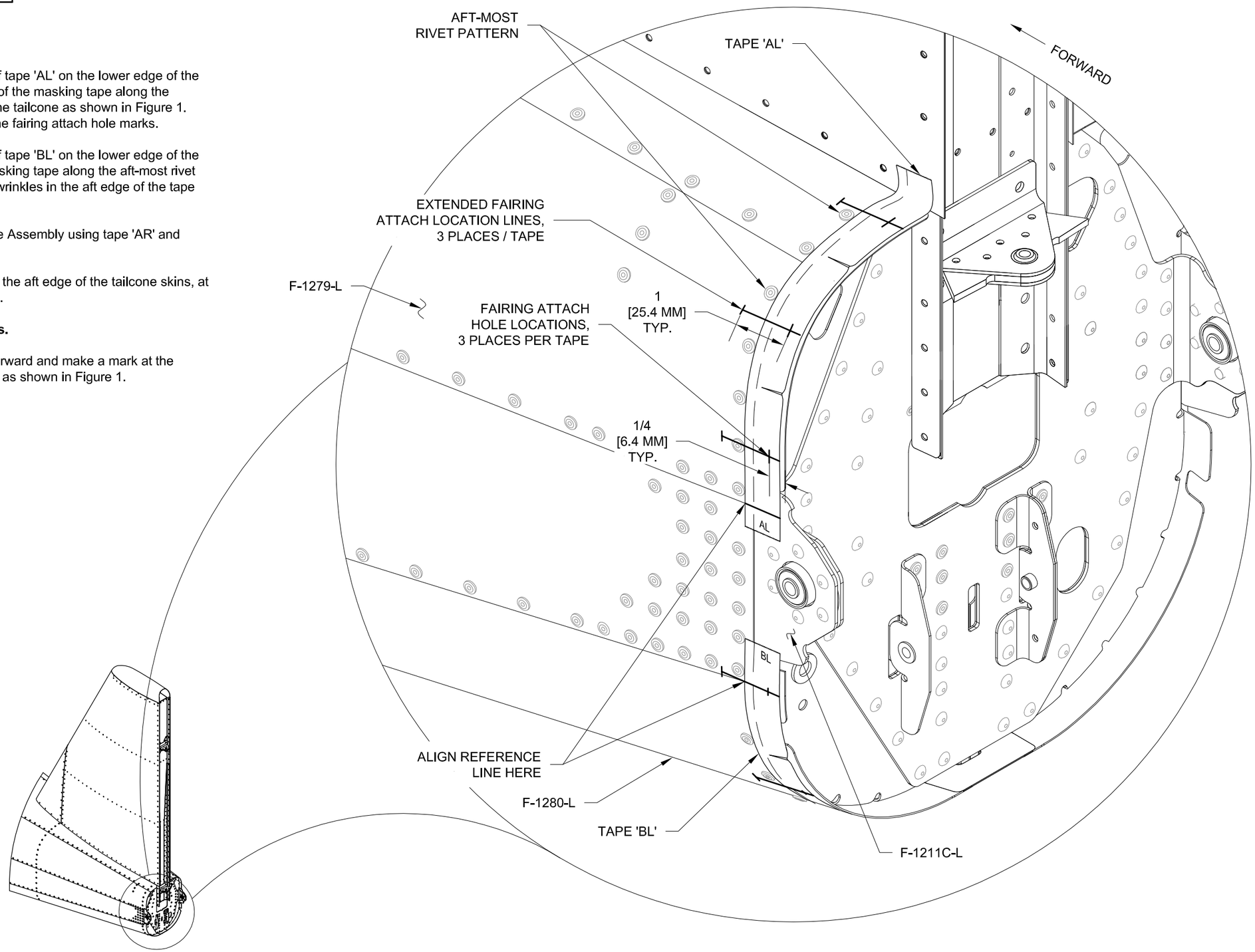


FIGURE 1:
MASKING TAPE POSITIONS

Step 1: Align the forward edge of the F-1294B-1 to the fairing edge line (ref Page 12iS/U-05, Figure 1) on tape 'BL' and 'BR' as shown in Figure 1. Temporarily tape or clamp the F-1294B-1 to the tailcone.

Step 2: Align the forward edge of the F-1294A to the fairing edge line on tape 'AL' and 'AR'. Align the notch from the 3/4 inch hole in the F-1294A with the 3/4 inch slot in the F-1294B-1.

Step 3: Sand the called out edges of the F-1294A for best fit, with minimal gap. See Figure 2. The best fit edges will be finished in a following step.

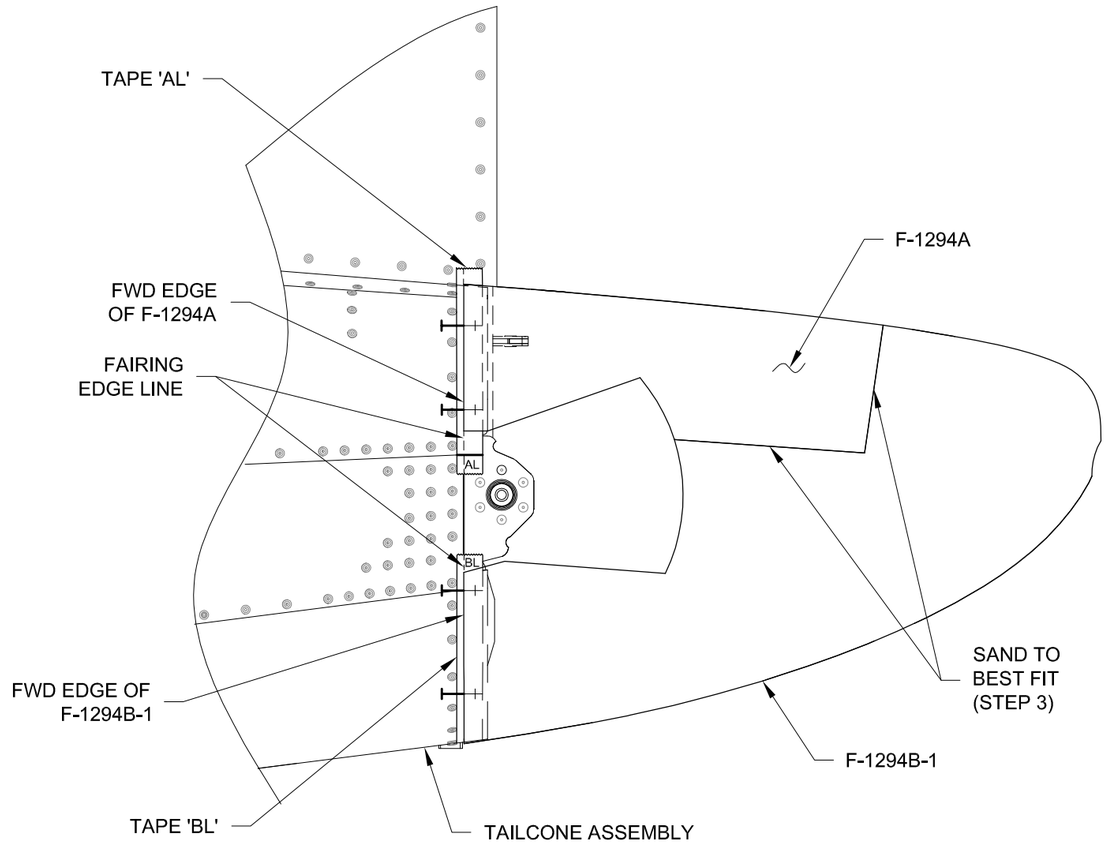


FIGURE 1:
FAIRING FIT

Step 4: Mark offset lines from the mating edges of the F-1294A at the dimensions shown in Figure 2.

Step 5: Mark the fastener hole locations on the F-1294A as shown in Figure 1 (exact location of the middle two holes along the offset line is not critical).

Step 6: With the F-1294A & B-1 Tailcone Fairings attached to the tailcone as instructed in Steps 1 and 2, clamp the F-1294A to the F-1294B-1.

Step 7: Match-Drill #40, then cleco the F-1294A and F-01294B-1 at the hole locations marked in Step 4. Remove the tailcone fairings from the tailcone.

NOTE: To make a modified #27 drill bit, drill a 1/8 in. [3.2 mm] deep hole in concrete using a #27 drill bit. A modified #27 bit will be used throughout the remainder of the assembly instructions.

Step 8: Final-Drill the F-1294A and F-1294B-1 using a modified #27 drill bit. Cleco each hole after drilling.

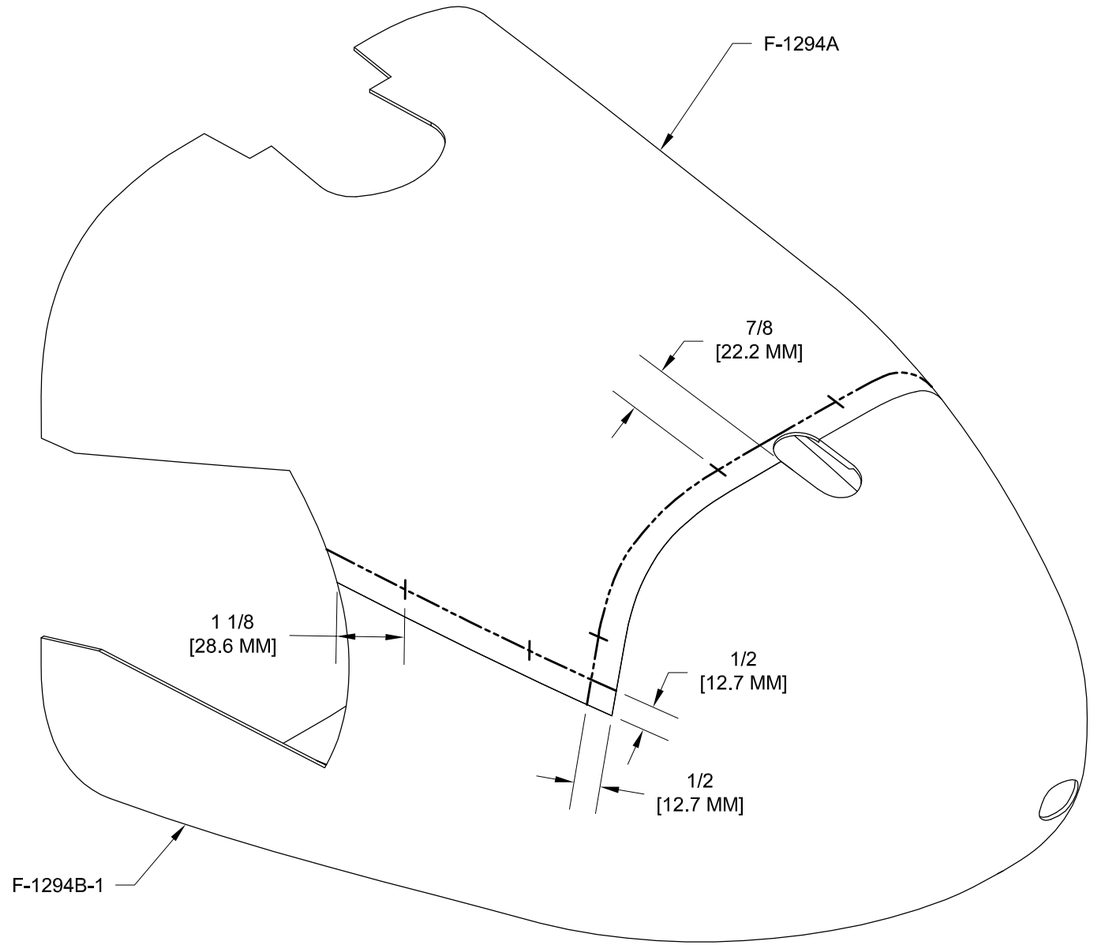


FIGURE 2:
DRILLING THE FAIRINGS

Step 1: Using a #6 screw, locate a nutplate through one of the #27 holes in the F-1294B-1. Bend the nutplate attachment tabs as necessary to conform to the fairing.

Step 2: Match-Drill #40 one of the nutplate attach rivet holes into the fairing. Cleco that hole. Then Match-Drill #40 the remaining nutplate attach hole. Mark the location of each nutplate.

Repeat Steps 1 and 2 for the remaining nutpates as shown in Figure 1.

NOTE: Machine countersinks into fiberglass that are up to .005 too shallow are acceptable , even preferable, to countersinks which are too deep. Rivets should be slightly under set where installed in fiberglass parts.

Step 3: Machine countersink the nutplate rivet holes in the fairing as shown in Figure 1.

Step 4: Rivet the nutplates to the F-1294B-1 using the rivets called out in Figure 1.

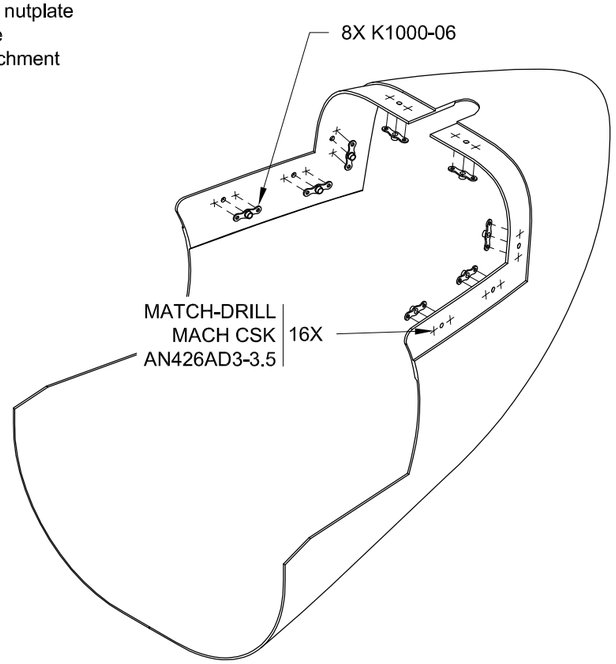


FIGURE 1:
F-1294B-1 NUTPLATE INSTALLATION

Step 5: Using #6 screws, temporarily screw the F-1294A to the F-1294B-1 as shown in Figure 1.

Step 6: Mark, separate, then sand the F-1294A to a flush and even gap between the mating edges of the Upper and Lower Tailcone Fairings.

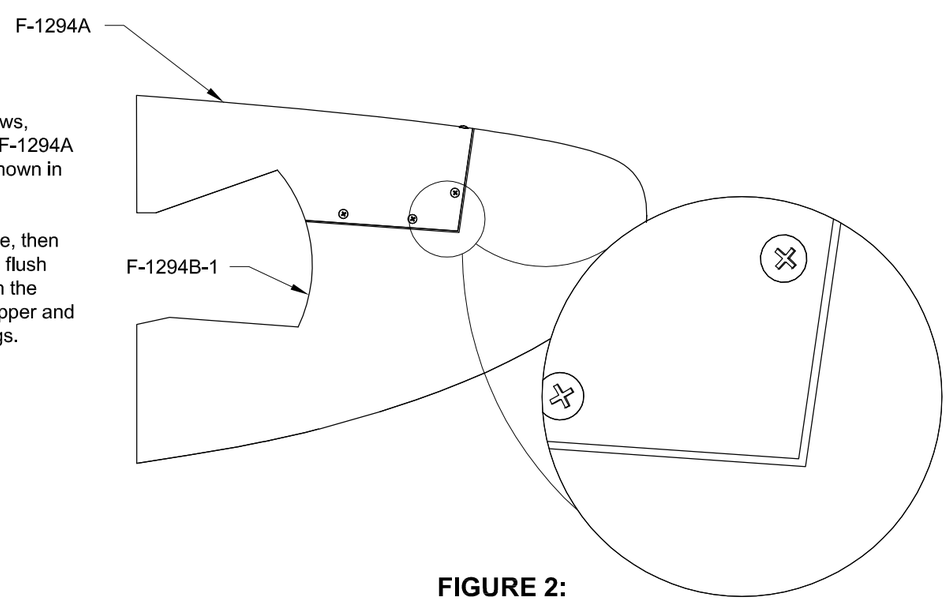


FIGURE 2:
F-1294 ASSEMBLY GAP

Step 7: Trim the aft slot to the scribe line in the F-1294B-1 by removing the material shown hatched in Figure 3.

Step 8: Machine countersink the F-1294A as shown in Figure 3.

Step 9: Attach the F-1294A to the F-1294B-1 using the hardware called out in Figure 3.

Refer to the joined fairings as the F-1294 Assembly.

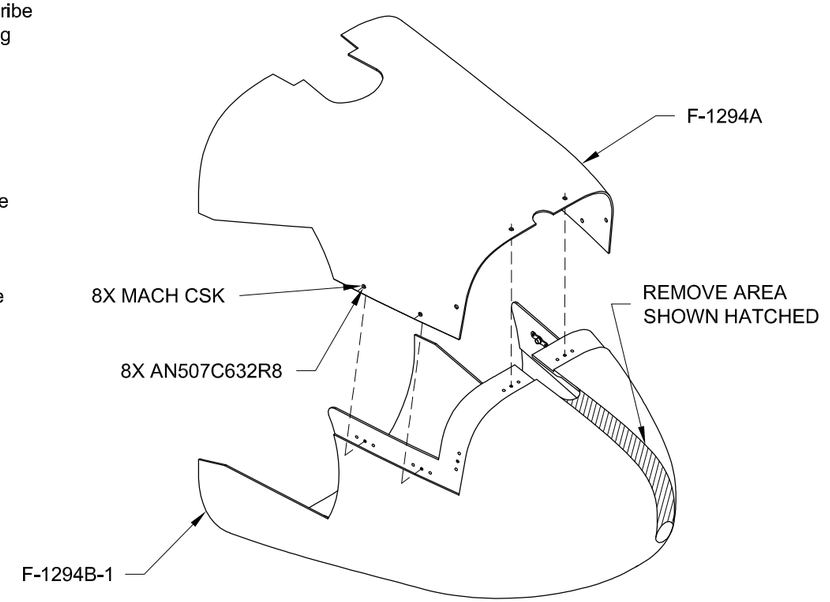


FIGURE 3:
F-1294 ASSEMBLY

Step 10: Install the Rudder Assembly to the V-Stab Assembly as shown in Figure 4. Refer to Section 11iS/U.

Step 11: Align the forward edge of the F-1294 Assembly to the fairing edge line on each piece of masking tape (Refer to Page 12iS/U-05, Figure 1). If/as necessary adjust the alignment to ensure at least 1/8 inch clearance from the bottom edge of the Rudder Assembly. Clamp the Fairing Assembly in position.

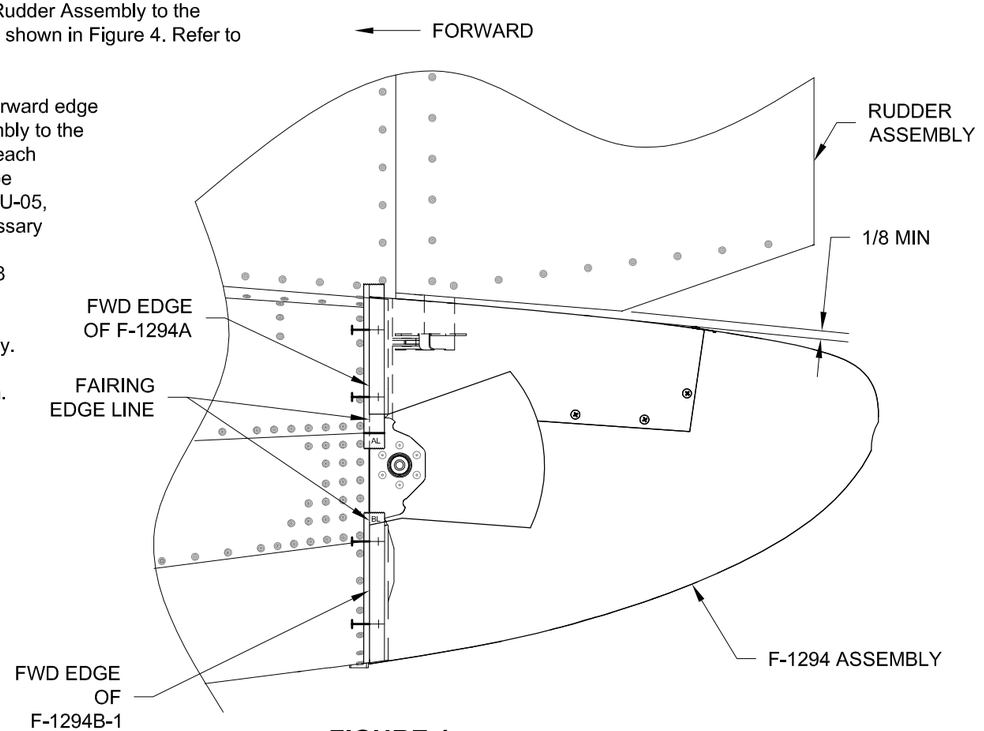


FIGURE 4:
FAIRING FIT

NOTE: Refer to Section 5.18 MATCH-DRILLING OPAQUE FIBERGLASS PARTS.

NOTE: The following steps refer to the Extended Fairing Attach Location Lines marked on Page 12iS/U-06, Step 4.

Step 1: At the inboard Fairing Attach Hole Location marked on masking tape "AL", measure along the Extended Fairing Attach Location Lines and mark the F-1294A at the dimensions shown in Figure 1. Match-Drill #40 the F-1294A and Tailcone Assembly at the inboard location only. Cleco the hole.

Step 2: At the inboard Fairing Attach Hole Location marked on masking tape "BL", measure along the Extended Fairing Attach Location Lines and mark the F-1294B-1 at the dimensions shown in Figure 1. Match-Drill #40 the F-1294B-1 and Tailcone Assembly at the inboard location only.

Step 3: Remove the F-1294 Assembly. Install the Stabilator Assembly (refer to Section 11iS/U). Cleco the F-1294 Assembly back in place.

Step 4: Adjust the alignment of the F-1294 Assembly to provide at least 1/8 inch of clearance between the F-1294 Assembly and the Stabilator Assembly main skins at any given point throughout the stabilator travel as shown in Figure 1.

Step 5: Repeat Steps 1 and 2 to the right side using the 'AR' and 'BR' masking tape.

Re-check clearances between the F-1294 Assembly and the Rudder and Stabilator Assembly main skins.

Step 6: With the four existing holes clecoed, repeat Step 1 for the remaining fairing attach locations. Cleco as you go.

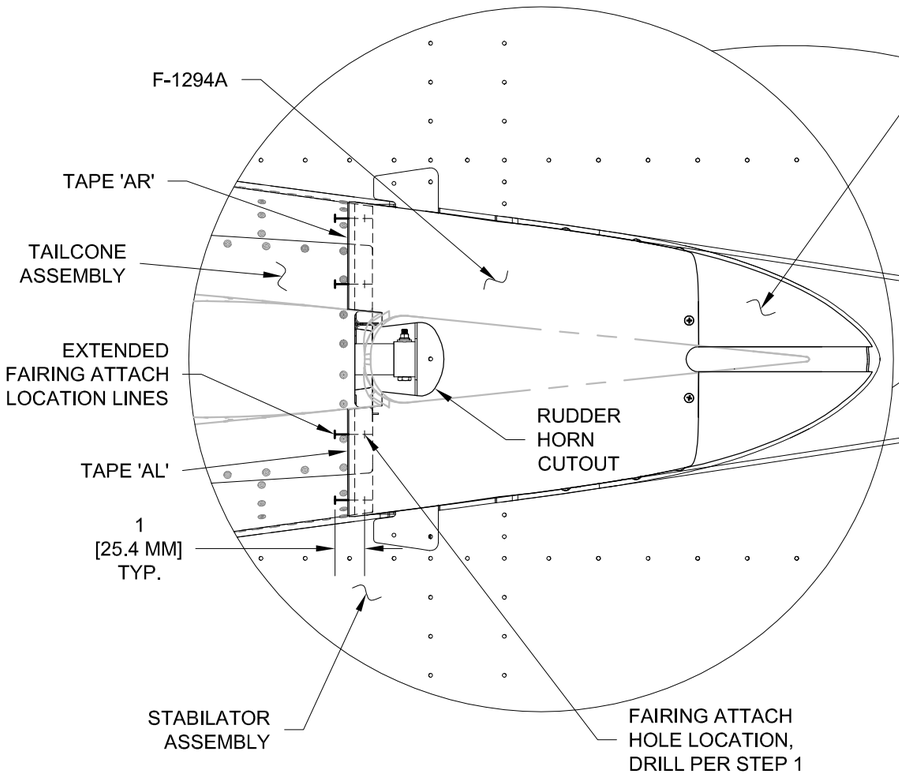
Remove the F-1294 Assembly, deburr the holes and clear away any loose material. Re-cleco and verify the clearance between the F-1294 Assembly and the Rudder and Stabilator Assemblies.

Step 7: Final-Drill with modified #27 (refer to Page 12iS/U-07) the holes common to the F-1294 Assembly and the Tailcone Assembly. Cleco as you go.

Remove the F-1294 Assembly, deburr the holes and clear away any loose material. Re-cleco.

Step 8: Check the clearance between the F-1294 Assembly spar box cutout and the Stabilator Assembly spar box throughout the full travel of the Stabilator Assembly as shown in Figure 1, Detail B-B. Check the clearance between the F-1294 Assembly rudder horn cutout and the rudder horn throughout the full travel of the Rudder Assembly as shown in Figure 1, Detail A. Mark, and trim any areas of interference for at least 1/8 inch of clearance to the F-1294 Assembly.

Remove the F-1294 Assembly.



DETAIL A

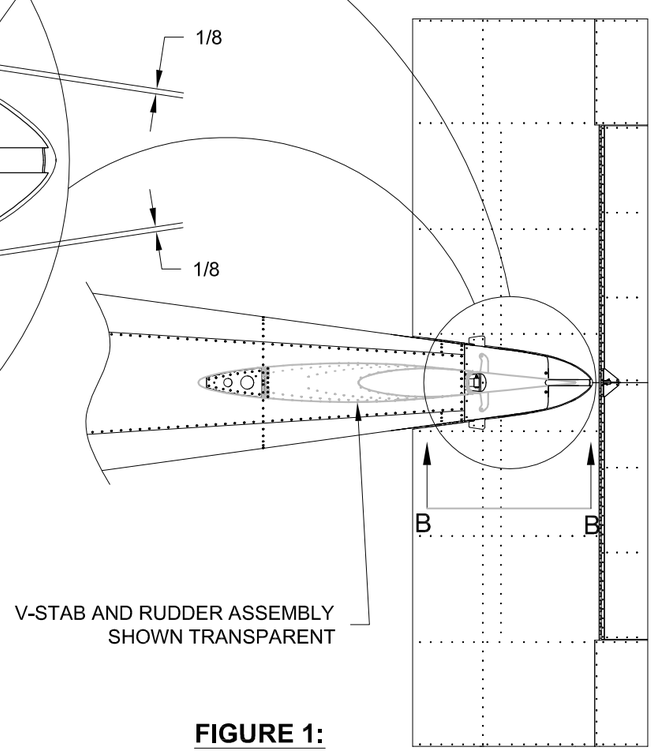
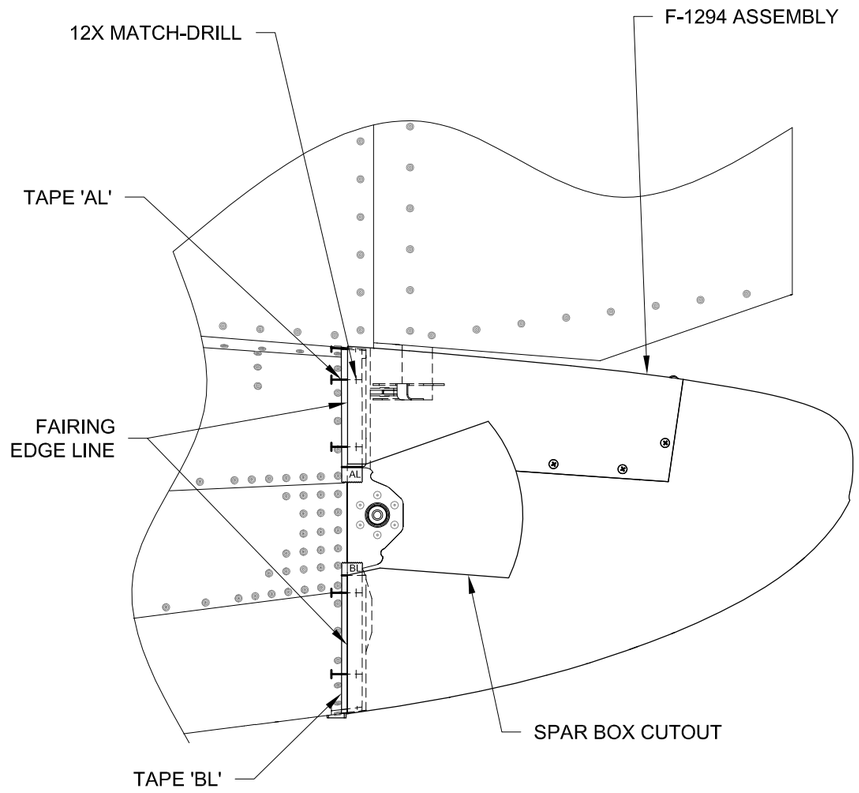


FIGURE 1:
FAIRING ALIGNMENT



DETAIL B-B
STABILATOR NOT SHOWN

Step 1: Locate a nutplate, using a #6 screw, through one of the #27 fairing attach holes in the aft of the Tailcone Assembly. Bend the nutplate attach tabs as necessary to conform to the tailcone skins.

Step 2: Match-Drill using an extended #40 one of the nutplate attach rivet holes into the Tailcone Assembly. Cleco that hole. Then match-drill #40 the remaining nutplate attach rivet hole. Mark the location of each nutplate.

Repeat Step 1 and 2 for all of the fairing attach nutplates.

Step 3: Tap the called out nutplates half way through the screw hole per call-out in Figure 1.

Step 4: Dimple, using a 3/32 die, the #40 nutplate attach rivet holes in the Tailcone Assembly per call-outs in Figure 1.

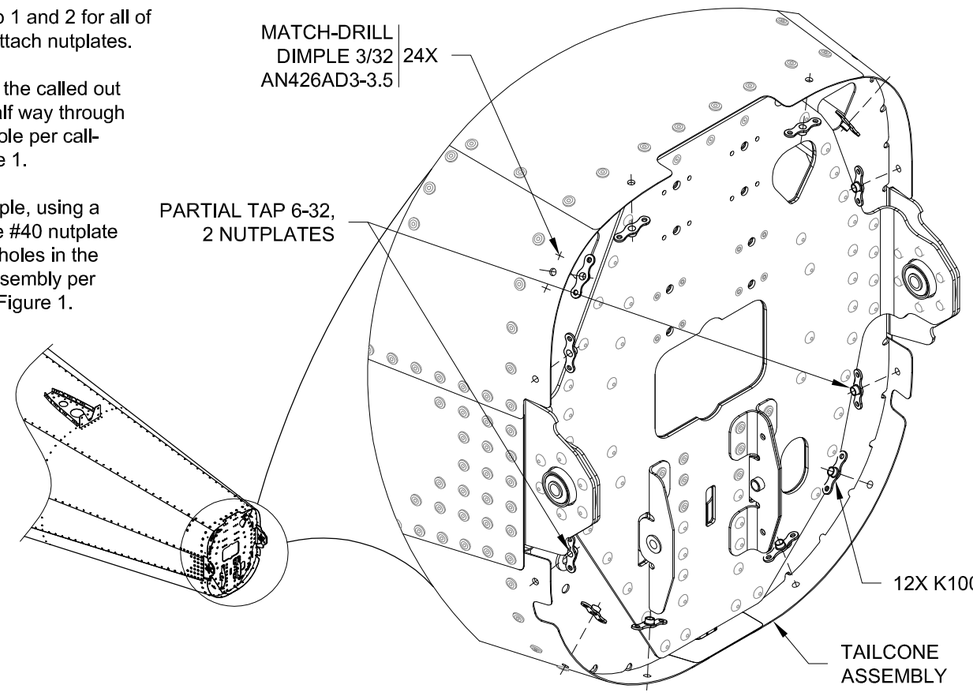


FIGURE 1:
FAIRING ATTACH NUTPLATES

Step 5: Dimple, using a 3/32 die, the attach rivet holes in the nutplates called out in Figure 2.

Step 6: Rivet the nutplates to the tailcone per marks made in Step 2, and call-outs in Figure 1.

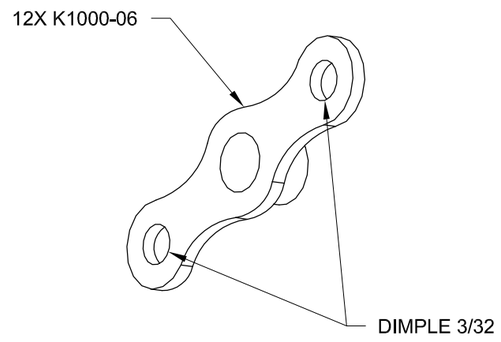


FIGURE 2:
NUTPLATE PREPARATION

Step 7: Drill a 3/4 hole using a step drill bit within the scribe line at the bottom of the F-1294B-1 Lower Tailcone Fairing as shown in Figure 3.

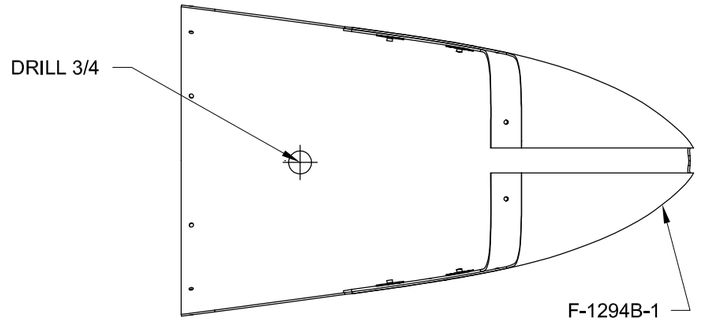


FIGURE 3:
TRIM/SERVO LINKAGE HOLE

Step 8: Install the Trim/Servo Assembly. Refer to Section 11iS/U for attachment instructions.

Step 9: Refer to Section 11iS/U for temporary Trim/Servo Assembly actuation instructions. Actuate the Trim/Servo Assembly to be **fully retracted**.

Step 10: Attach the F-1294 Assembly to the Tailcone Assembly.

Step 11: Check the clearance between the Trim/Servo Assembly and the F-1294 Assembly throughout the Stabilator Assembly travel as shown in Figure 4. If necessary, mark then trim the upper and lower tailcone fairings to provide at least 1/8 inch of clearance for the Trim/Servo Assembly.

Remove the upper and lower tailcone fairings.

Step 12: Repeat Step 8 through 10 with the Trim/Servo Assembly **fully extended**.

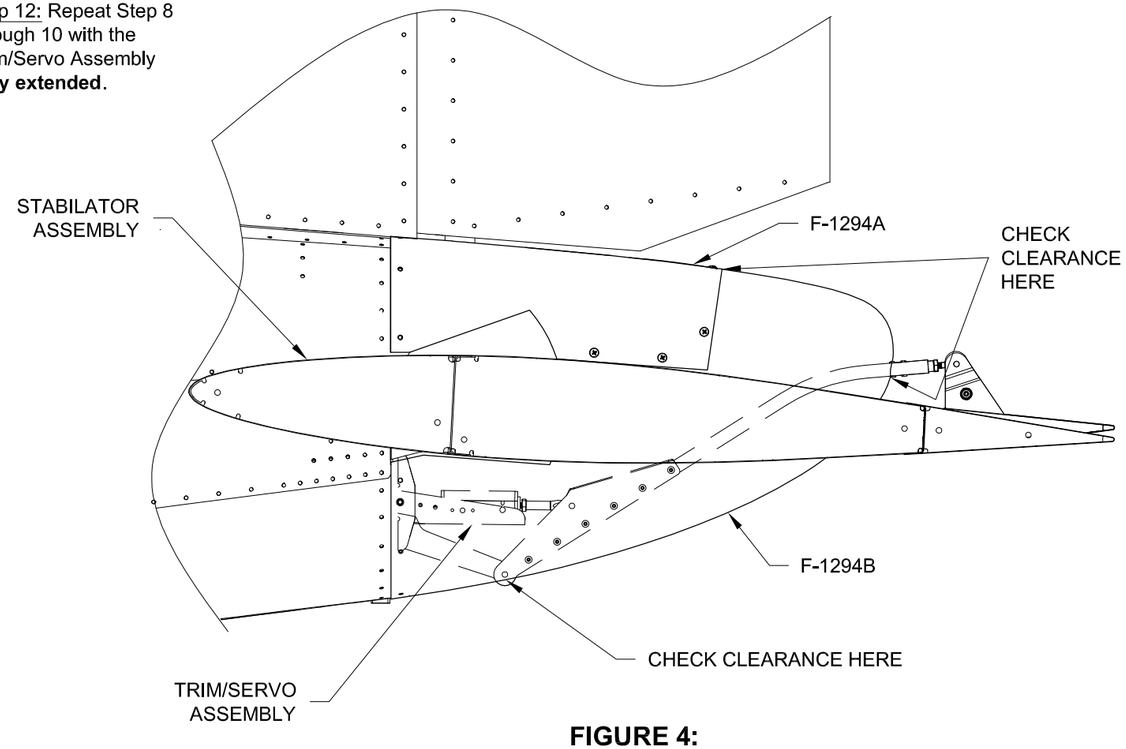


FIGURE 4:
TRIM/SERVO CLEARANCE

Step 1: Install the F-1294A & B-1 to the Tailcone Assembly using screws called out in Figure 1.

Step 2: Re-check the clearance throughout the travel of the Rudder, Stabilator and Trim/Servo Assemblies to the F-1294A & B-1. At least 1/8 inch of clearance is needed.

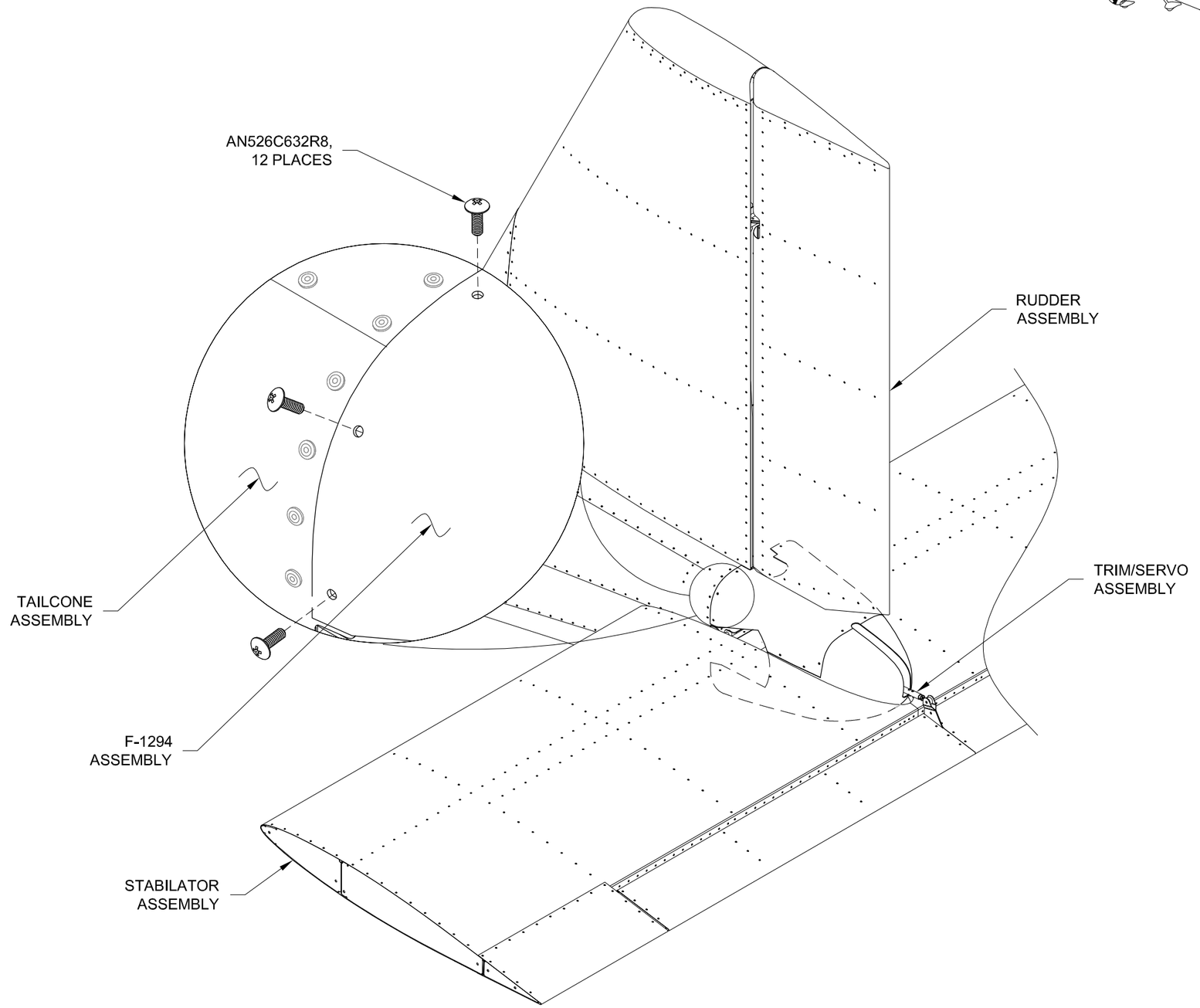


FIGURE 1:
FAIRING INSTALLATION

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