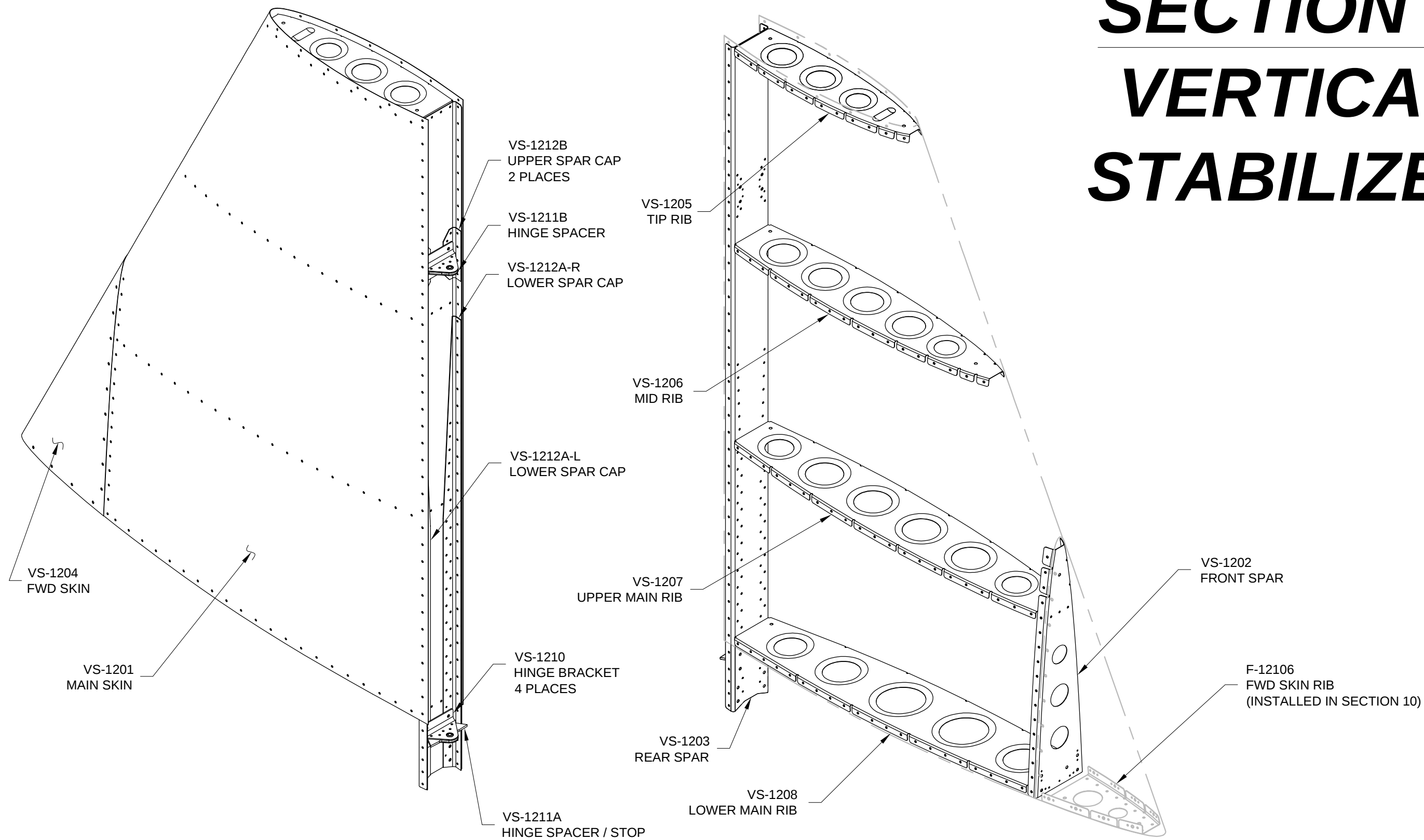


SECTION 6: VERTICAL STABILIZER





Step 1: Read Section 5 and preview all assembly steps prior to construction.

NOTE: Step 2 through Step 4 refer to Figure 1. In these steps you will fabricate a wedge tool that will assist you when blind riveting in locations where you are unable to align the tool and the rivet. The wedge tool(s) will be placed between the rivet and the riveting tool enabling the riveting tool to pull the rivet from an angle, yet still achieve a properly seated manufactured head. For an example of how to use this tool refer to Section 5D.

Step 2: Trim both of the 'ears' off of the AEX Wedge.

Step 3: Beginning 1/4 inch from either end of the AEX Wedge, drill a hole every 1/2 inch using a #40 drill bit.

Step 4: Cut the AEX Wedge between each of the holes drilled in Step 3. You will now have multiple wedge tools to aid riveting, when applicable.

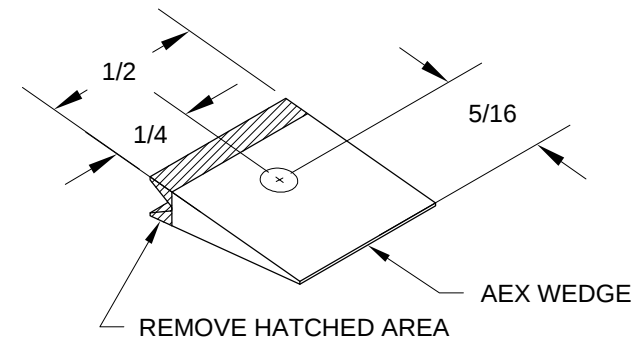


FIGURE 1:
WEDGE TOOL FABRICATION

Step 5: Final-Drill #12 the 3/16 holes in the flange of the VS-1210 Hinge Brackets called out in Figure 2.

Step 6: Separate the VS-1210 Hinge Brackets by removing the material called out in Figure 2.

Separation is best done by cutting through the joining material and finishing the edge with a file.

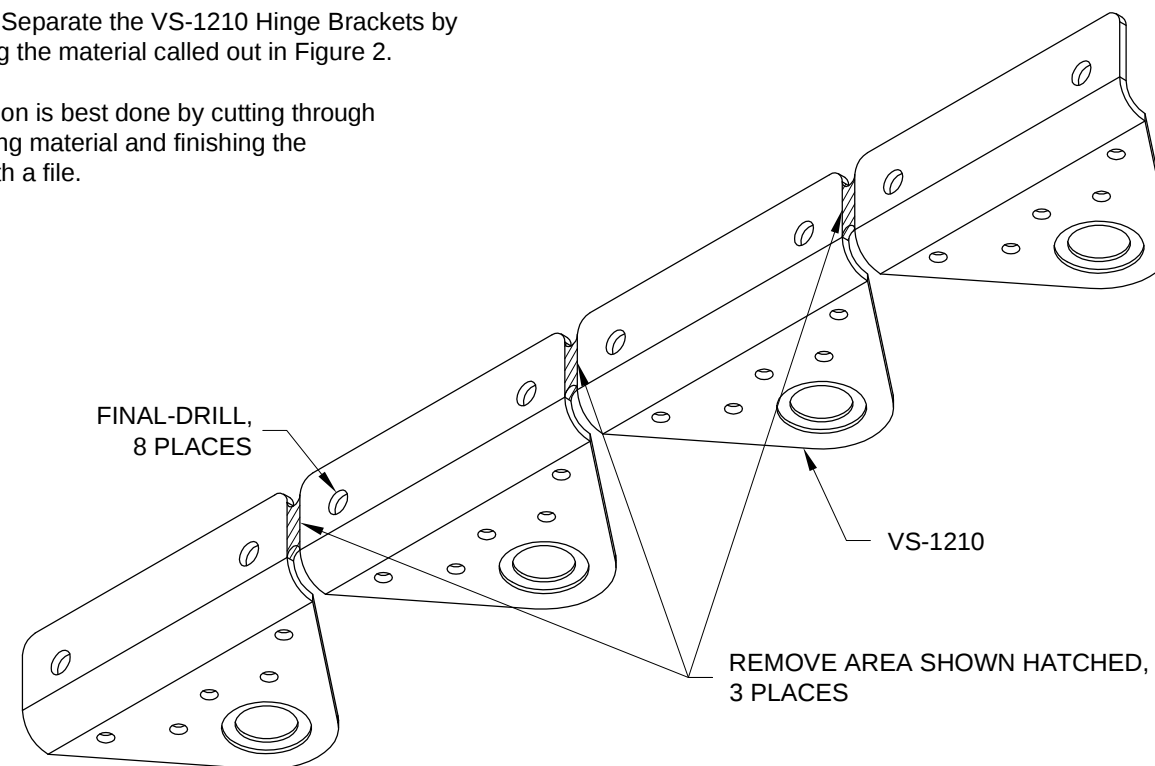


FIGURE 2:
HINGE BRACKET PREPARATION

Step 7: Mark the VS-1211 Hinge Spacers with the VS-1211A and VS-1211B part numbers as shown in Figure 3. Separate the VS-1211A and VS-1211B by removing the material called out in Figure 3.

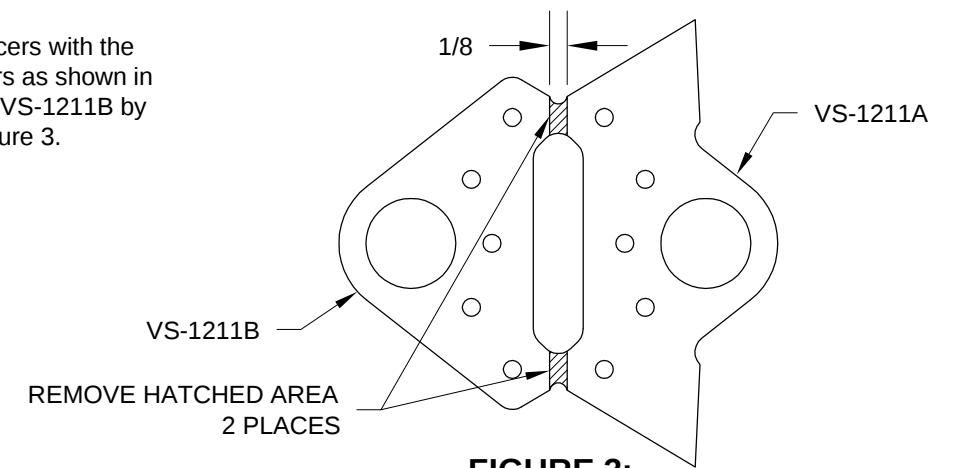


FIGURE 3:
HINGE SPACER SEPARATION

Step 8: Cleco the VS-1211A Hinge Spacer between two of the VS-1210 Hinge Brackets. Final-Drill #30 the 1/8 inch holes.

Repeat Step 8 with the VS-1211B Hinge Spacer and the remaining two hinge brackets.

Mark the parts (Section 5C), to return them to the same position as drilled. Then remove the clecoes and deburr (Section 5B) the edges and holes of all four hinge brackets and both hinge spacers.

Step 9: Insert the called out bearing into the largest hole in the VS-1211A Hinge Spacer. Re-cleco, then rivet the hinge spacer between the two VS-1210 Hinge Brackets in the same position as drilled per call-outs in Figure 4.

Refer to this assembly as the Lower Hinge Assembly.

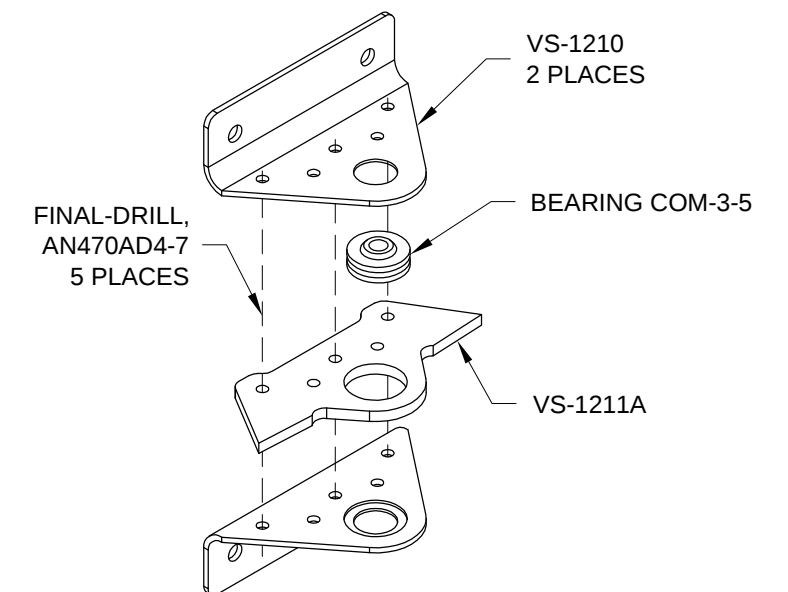


FIGURE 4:
LOWER HINGE ASSEMBLY

Step 10: Insert the called out bearing into the largest hole in the VS-1211B Hinge Spacer. Re-cleco, then rivet the hinge spacer between the two VS-1210 Hinge Brackets in the same position as drilled per call-outs in Figure 5.

Refer to this assembly as the Upper Hinge Assembly.

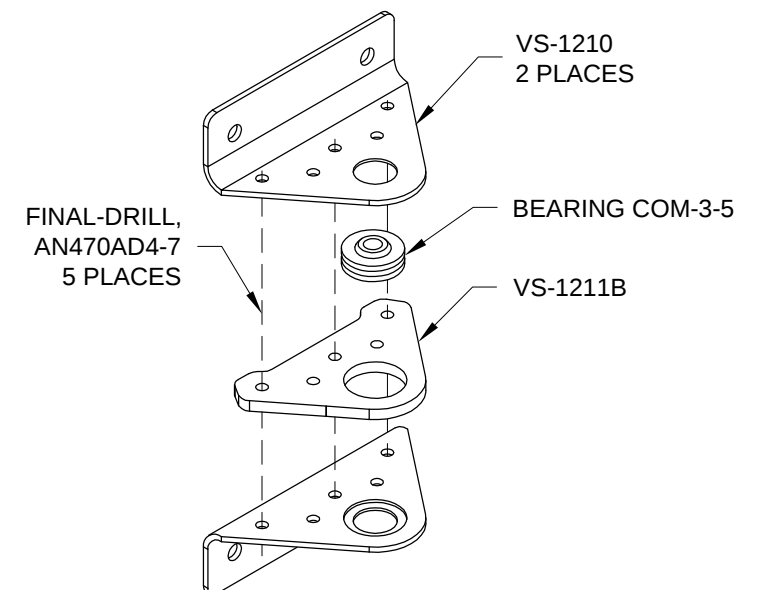


FIGURE 5:
UPPER HINGE ASSEMBLY

NOTE: Step 1 through Step 7 describe installing the VS-1212A-R Lower Spar Cap and VS-1212B-R Upper Spar Cap to the right side of the VS-1203 Rear Spar. Installation of the left side is a mirror of the right and is done at the same time.

Step 1: Separate the VS-1212A-R Lower Spar Cap and VS-1212B-R Upper Spar Cap, and trim the lower spar cap by removing the material called out in Figure 1. Mark (Section 5C) the parts with the part numbers shown in Figure 1.

Duburr all of the edges of both parts.

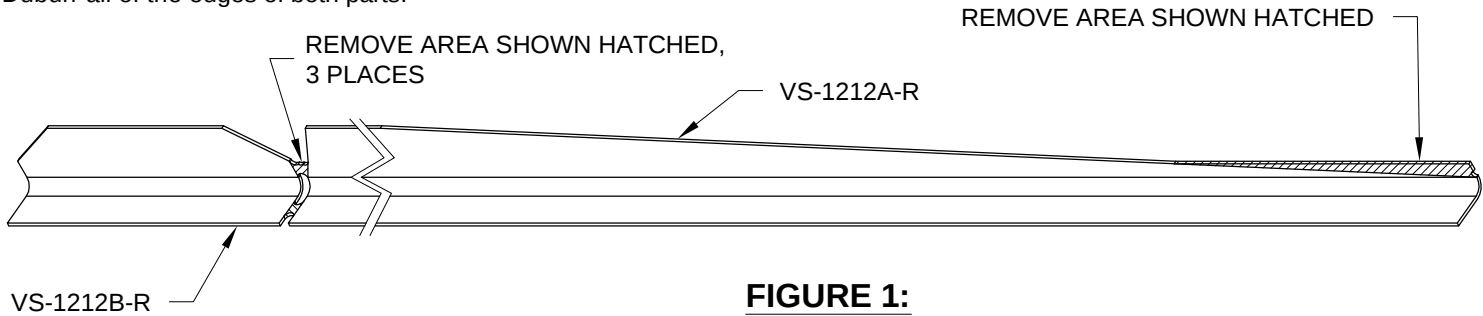


FIGURE 1:
SPAR CAP SEPARATION

Step 2: Mark the VS-1212B-R Upper Spar Cap with a reference line on the surface that nests against the VS-1203 Rear Spar web per the dimension shown in Figure 2.

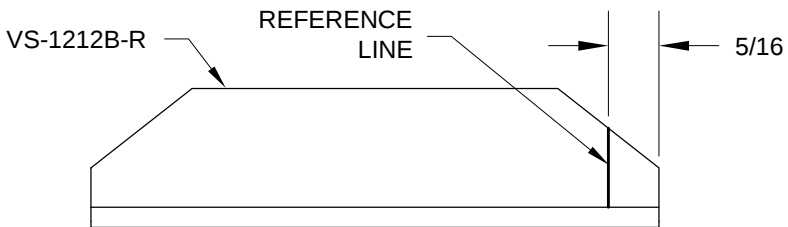


FIGURE 2:
SPAR CAP REFERENCE LINE

Step 3: Nest the VS-1212B-R Upper Spar Cap into the VS-1203 Rear Spar so the reference line shows through the center of the #30 hole in the rear spar web called out in Figure 3.

Clamp the upper spar cap in place.

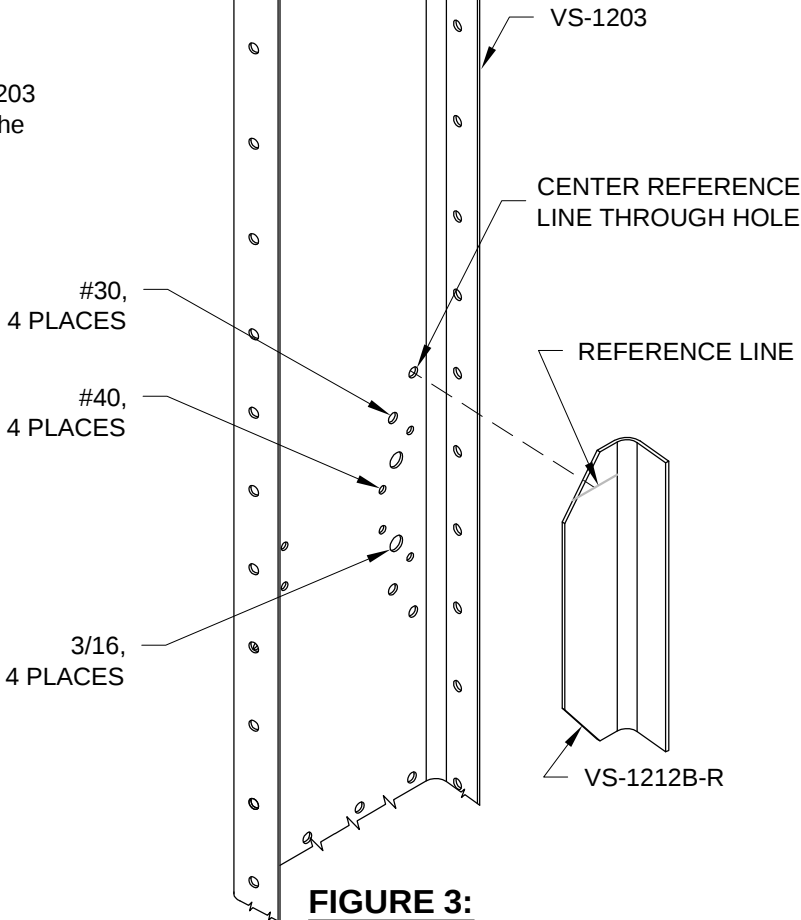


FIGURE 3:
UPPER SPAR CAP MATCH-DRILL

NOTE: For Steps 4 through 7, refer to Figure 3 and 4

Step 4: Nest the VS-1212A-R Lower Spar Cap into the VS-1203 Rear Spar. Align the bottom edge of the lower spar cap flush with the bottom edge of the rear spar web then clamp it in place along the rear spar flange.

Starting from the #30 hole nearest to the bottom of the rear spar web, match-drill #30 about every fourth hole of the rear spar web into the lower spar cap. Cleco each hole as you drill and be sure to drill perpendicular to the rear spar web. After reaching the top of the lower spar cap, move on to the VS-1212B-R Upper Spar Cap. Match-drill #30 the four #30 holes in the rear spar web into the upper spar cap. .

Remove the upper and lower spar caps and deburr the match-drilled holes. Clear away any chips, then cleco the upper and lower spar caps back in place. Match-Drill the remaining #30 holes of the rear spar web into the lower spar caps.

Step 5: Match-Drill #30 the VS-1203 Rear Spar flange holes into the VS-1212A-R and VS-1212B-R Upper and Lower Spar Caps. Cleco as you go.

Step 6: Match-Drill #40 the nutplate attach rivet holes from the VS-1203 Rear Spar into the VS-1212B-R Upper Spar Cap . With the same size bit match-drill the #40 holes near the bottom of the rear spar web into the VS-1212A-R Lower Spar Cap.

Step 7: Match-Drill #12 the 3/16 holes of the VS-1203 Rear Spar into the VS-1212A-R and VS-1212B-R Upper and Lower Spar Caps.

Remove the spar caps, deburr the holes and clear away any chips.

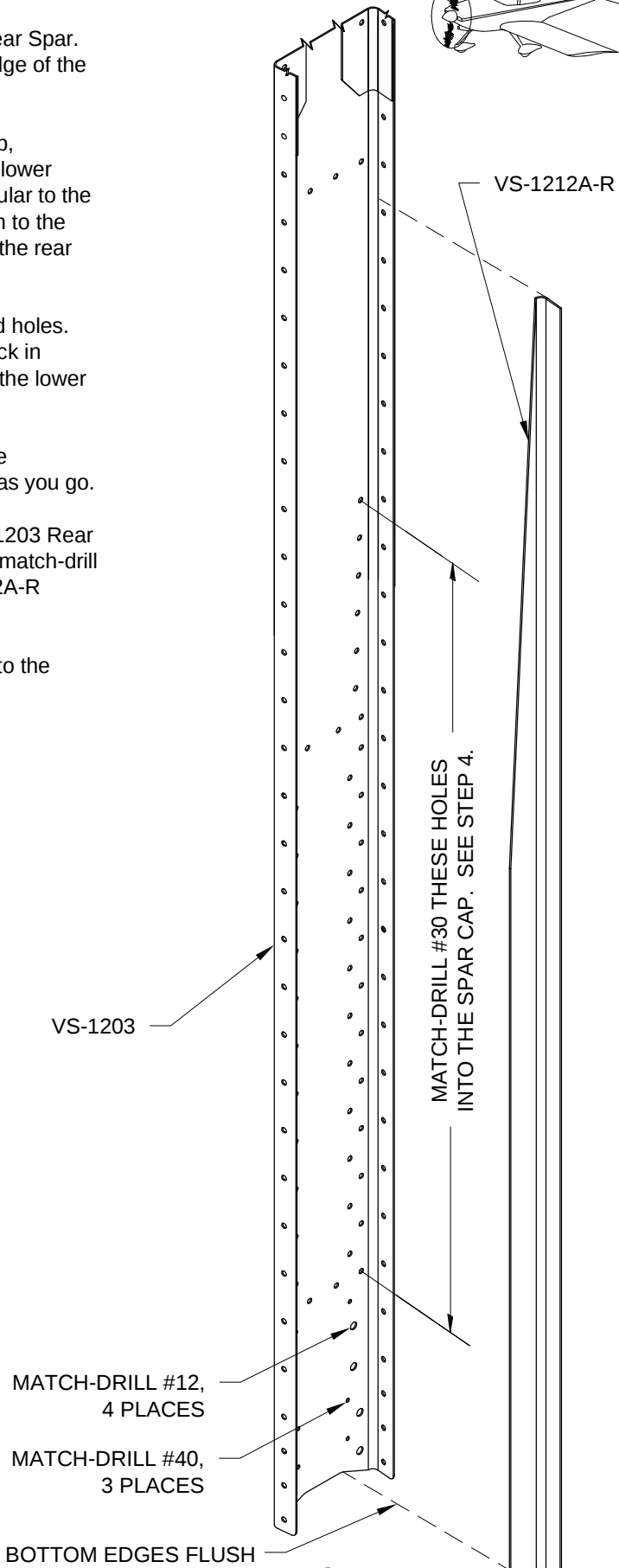


FIGURE 4:
LOWER SPAR CAP MATCH-DRILL

NOTE: Refer to Figure 1 for Step 1 through Step 4.

- Step 1: Final-Drill #12 the 3/16 holes in the web of the VS-1202 Front Spar.
- Step 2: Machine countersink (Section 5E) the six #40 holes in the web of the VS-1203 Rear Spar flush for 3/32 rivets.
- Step 3: Machine countersink the four #40 holes in the VS-1212B-R & -L Upper Spar Caps flush for 3/32 rivets.
- Step 4: Machine countersink the #40 holes in the web of the VS-1202 Front Spar flush for 3/32 rivets.

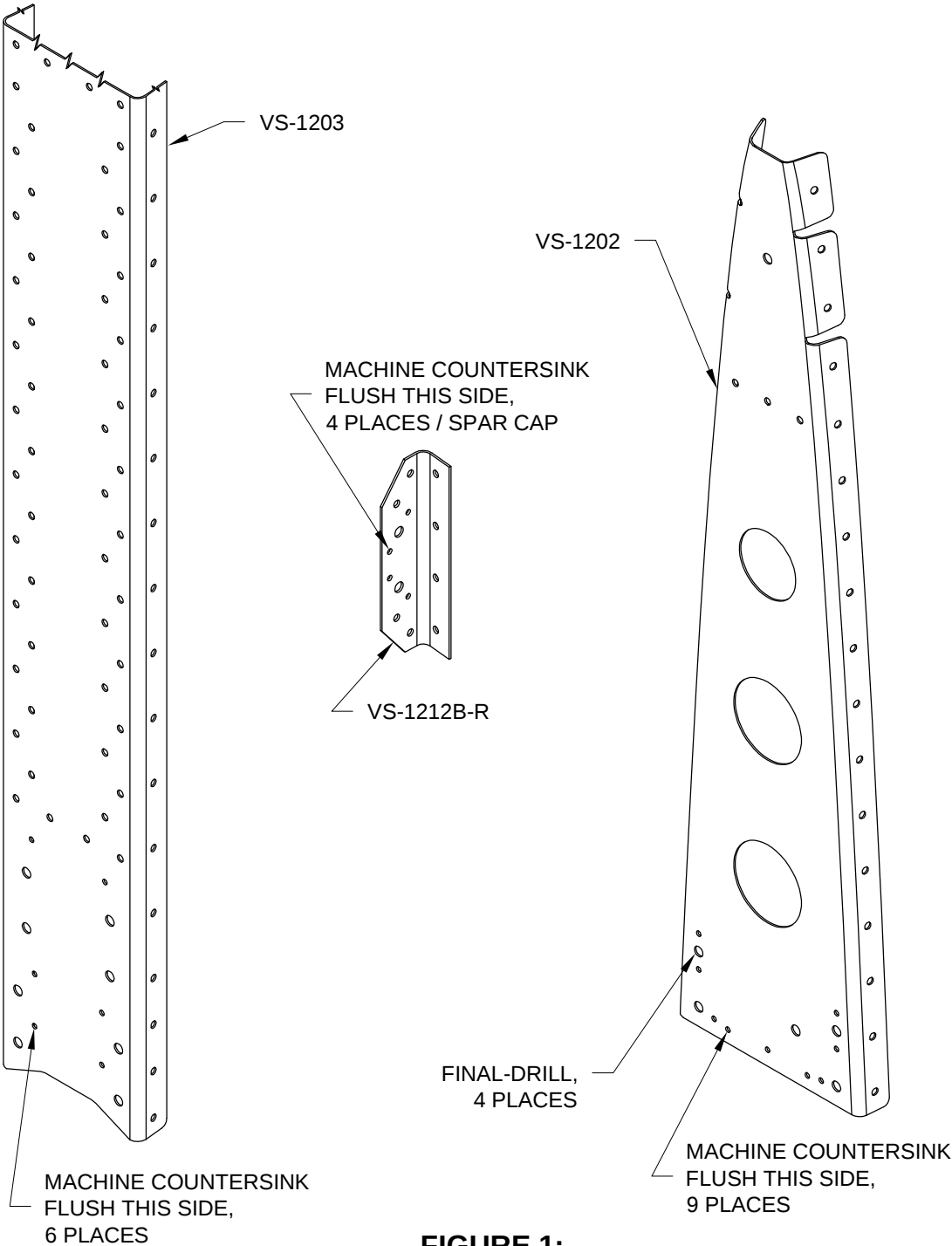


FIGURE 1:
PART PREPARATION

NOTE: The blind rivets for the VS-1203 Rear Spar should be set with the manufactured head on the spar cap side of the rear spar web since they will be visible on the finished assembly.

Step 5: Rivet the VS-1212B-R Upper Spar Cap to the VS-1203 Rear Spar as shown in Figure 2. Leave open the spar flange rivets for this step. Install the VS-1212B-L Upper Spar Cap as a mirror of the right. (The rivet wedge tool fabricated at the beginning of this section may be useful here for the rivets closest to the rear spar flange.)

Step 6: Rivet the nutplates to the VS-1203 Rear Spar and VS-1212B-R & -L Upper Spar Caps as shown in Figure 2.

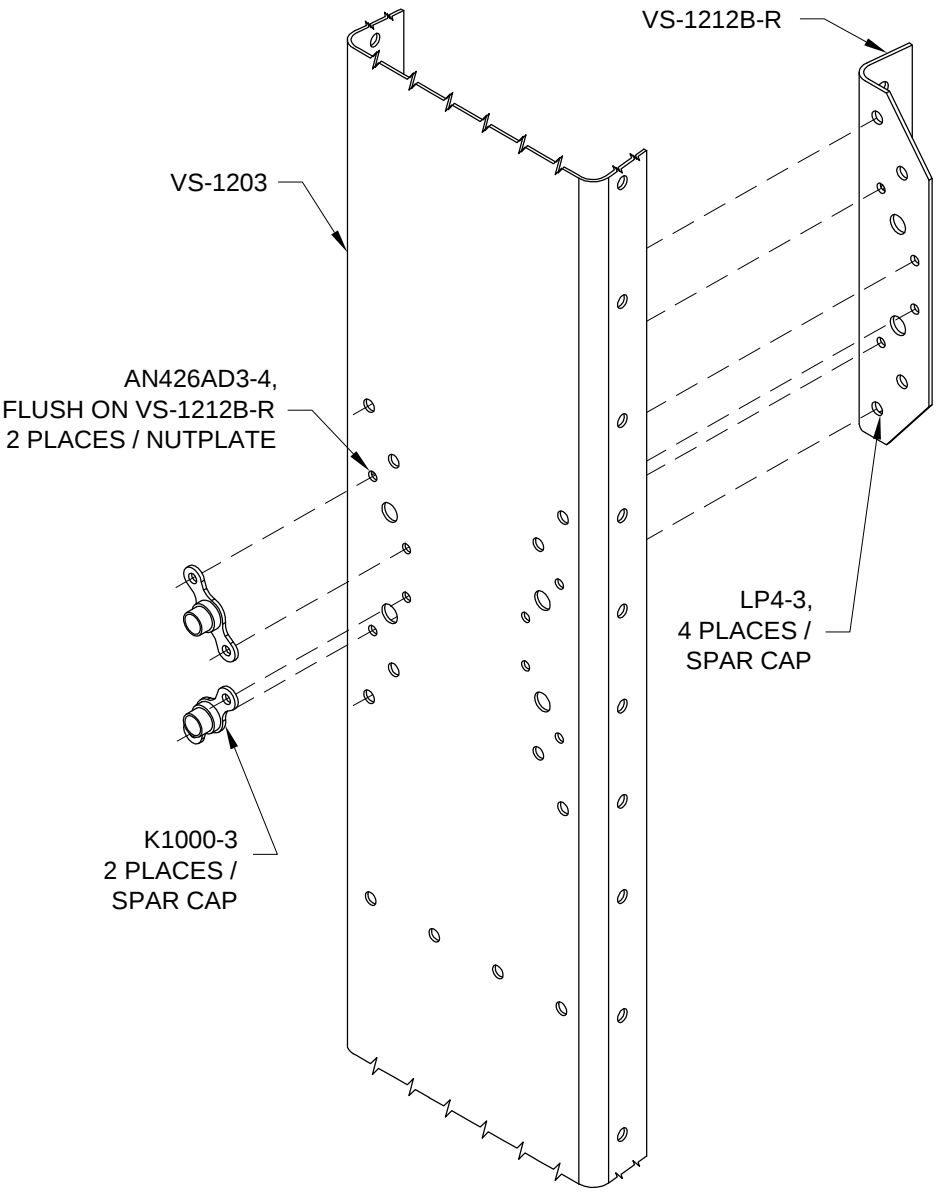


FIGURE 2:
SPAR CAP INSTALLATION

Step 7: Rivet the nutplates to the VS-1202 Front Spar per call-out in Figure 3.

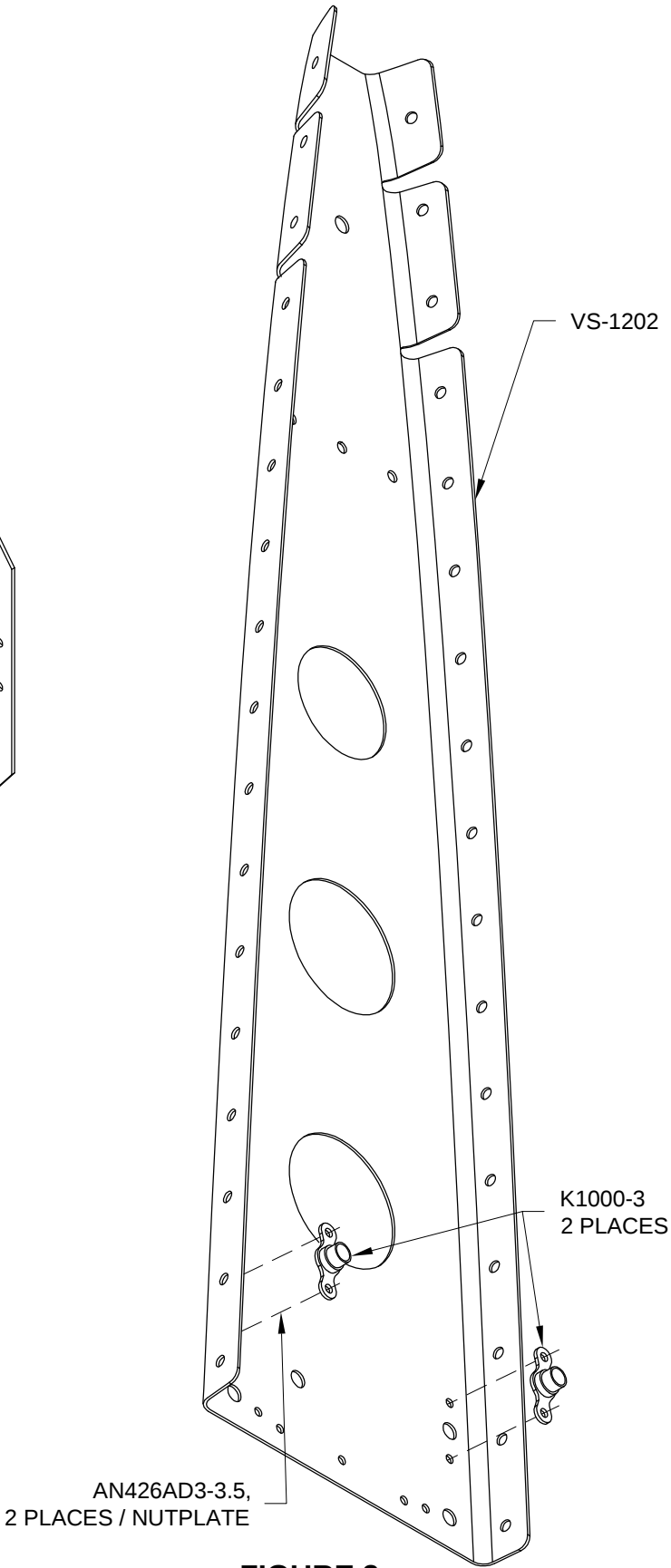
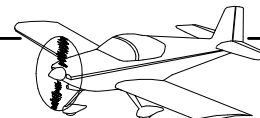


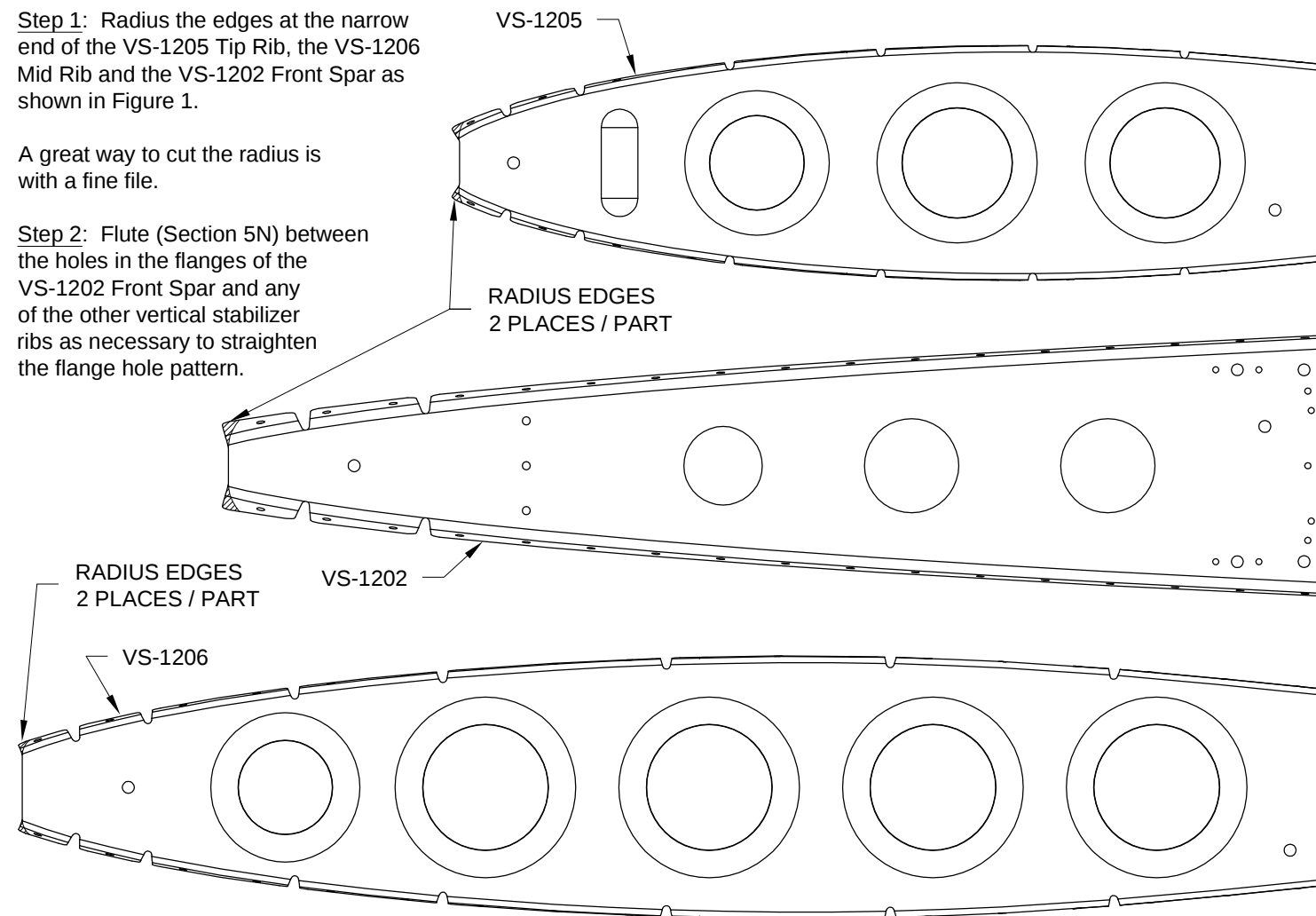
FIGURE 3:
NUTPLATE INSTALLATION



Step 1: Radius the edges at the narrow end of the VS-1205 Tip Rib, the VS-1206 Mid Rib and the VS-1202 Front Spar as shown in Figure 1.

A great way to cut the radius is with a fine file.

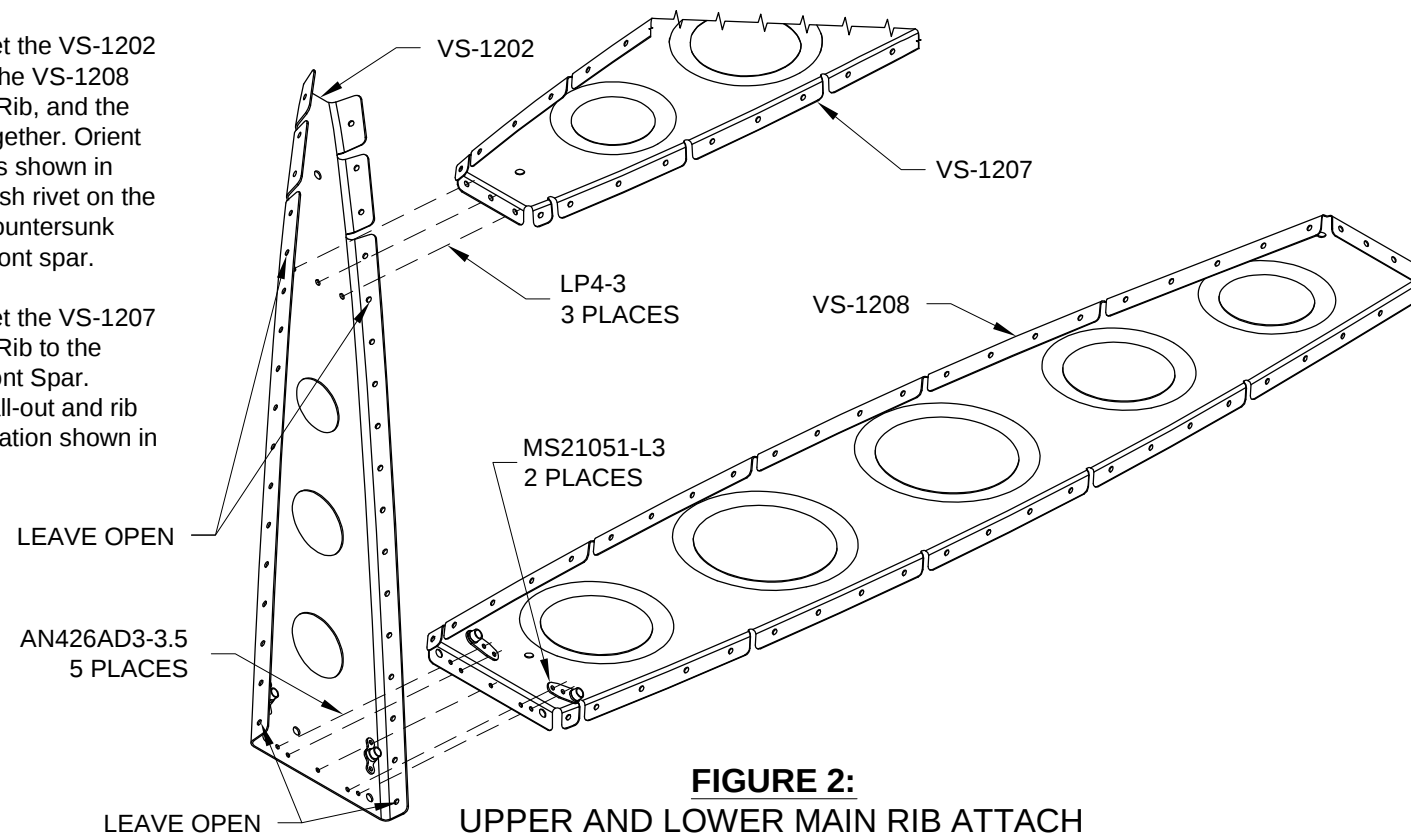
Step 2: Flute (Section 5N) between the holes in the flanges of the VS-1202 Front Spar and any of the other vertical stabilizer ribs as necessary to straighten the flange hole pattern.



**FIGURE 1:
RIB PREPARATION**

Step 3: Rivet the VS-1202 Front Spar, the VS-1208 Lower Main Rib, and the nutplates together. Orient rib flanges as shown in Figure 2. Flush rivet on the previously countersunk side of the front spar.

Step 4: Rivet the VS-1207 Upper Main Rib to the VS-1202 Front Spar. Hardware call-out and rib flange orientation shown in Figure 2.



**FIGURE 2:
UPPER AND LOWER MAIN RIB ATTACH**

NOTE: Rib flange orientation and hardware call-outs for Step 5 through Step 8 are shown in Figure 3.

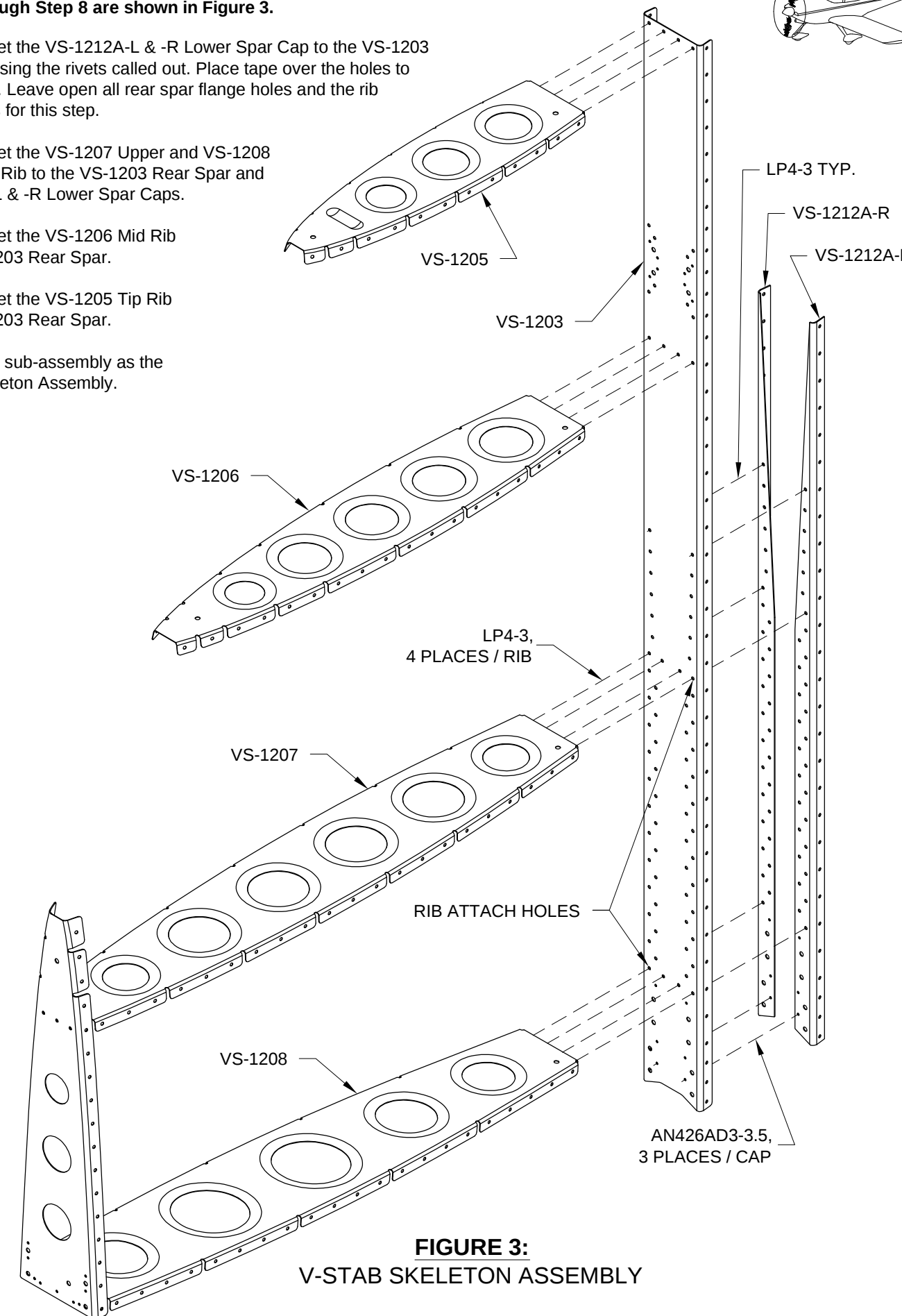
Step 5: Rivet the VS-1212A-L & -R Lower Spar Cap to the VS-1203 Rear Spar using the rivets called out. Place tape over the holes to be left open. Leave open all rear spar flange holes and the rib attach holes for this step.

Step 6: Rivet the VS-1207 Upper and VS-1208 Lower Main Rib to the VS-1203 Rear Spar and VS-1212A-L & -R Lower Spar Caps.

Step 7: Rivet the VS-1206 Mid Rib to the VS-1203 Rear Spar.

Step 8: Rivet the VS-1205 Tip Rib to the VS-1203 Rear Spar.

Refer to this sub-assembly as the V-Stab Skeleton Assembly.



**FIGURE 3:
V-STAB SKELETON ASSEMBLY**

Step 1: Remove the material from the VS-1204 Fwd Skin, called out in Figure 1.

Step 2: Remove the material from the VS-1201 Main Skin, called out in Figure 2, Detail A.

Step 3: Final-drill #19, the nutplate screw holes in the VS-1204 Fwd Skin per call-out in Figure 1.

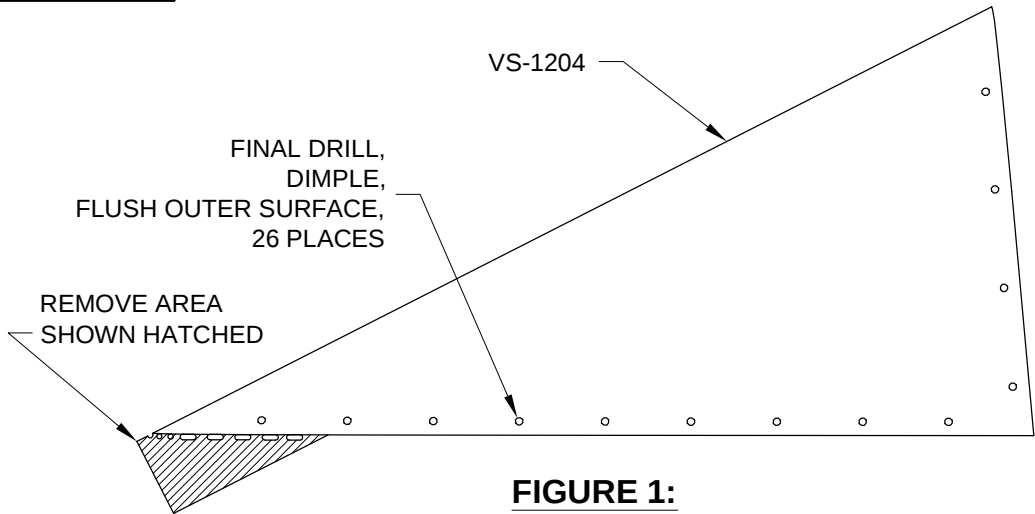
Step 4: Final-drill #19, the nutplate screw holes in the VS-1201 Main Skin per call-out in Figure 2, Detail B.

Deburr all of the final-drilled holes from Steps 3 and 4.

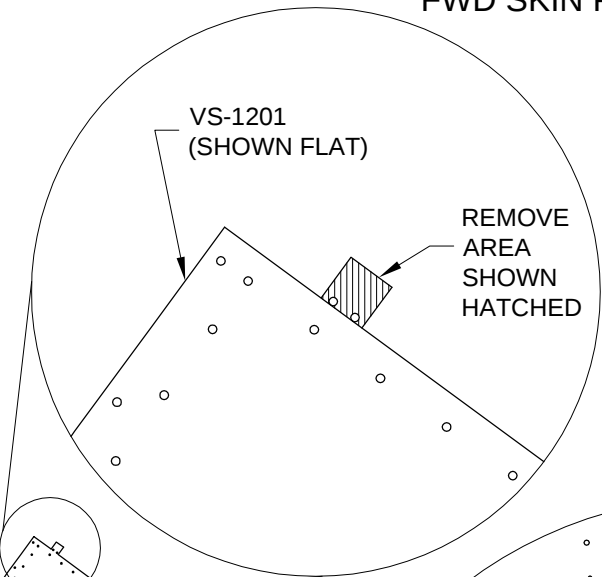
Step 5: Dimple the #19 holes in the VS-1204 Fwd Skin using a #8 dimple die as called out in Figure 1.

Step 6: Dimple the #19 holes in the VS-1201 Main Skin using a #8 dimple die as called out in Figure 2, Detail B.

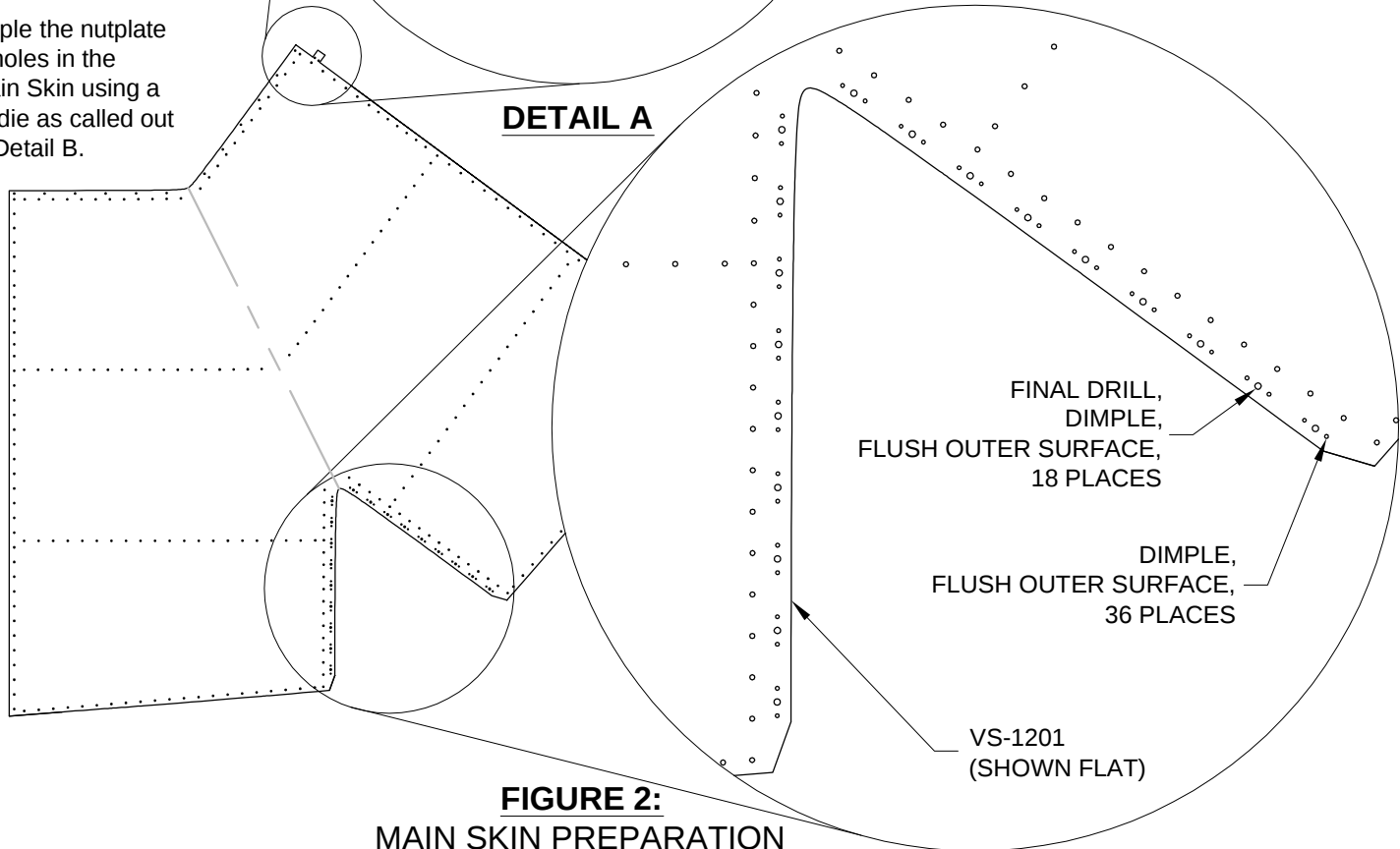
Step 7: Dimple the nutplate attach rivet holes in the VS-1201 Main Skin using a 3/32 dimple die as called out in Figure 2, Detail B.



**FIGURE 1:
FWD SKIN PREPARATION**



DETAIL A

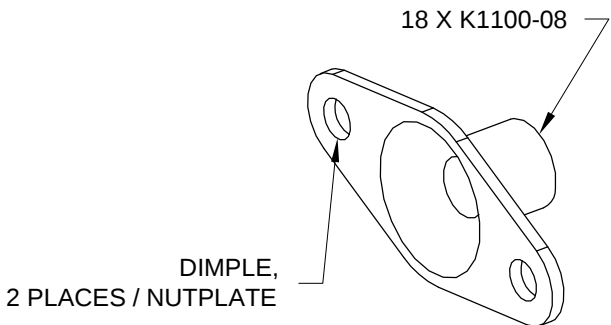


**FIGURE 2:
MAIN SKIN PREPARATION**

DETAIL B

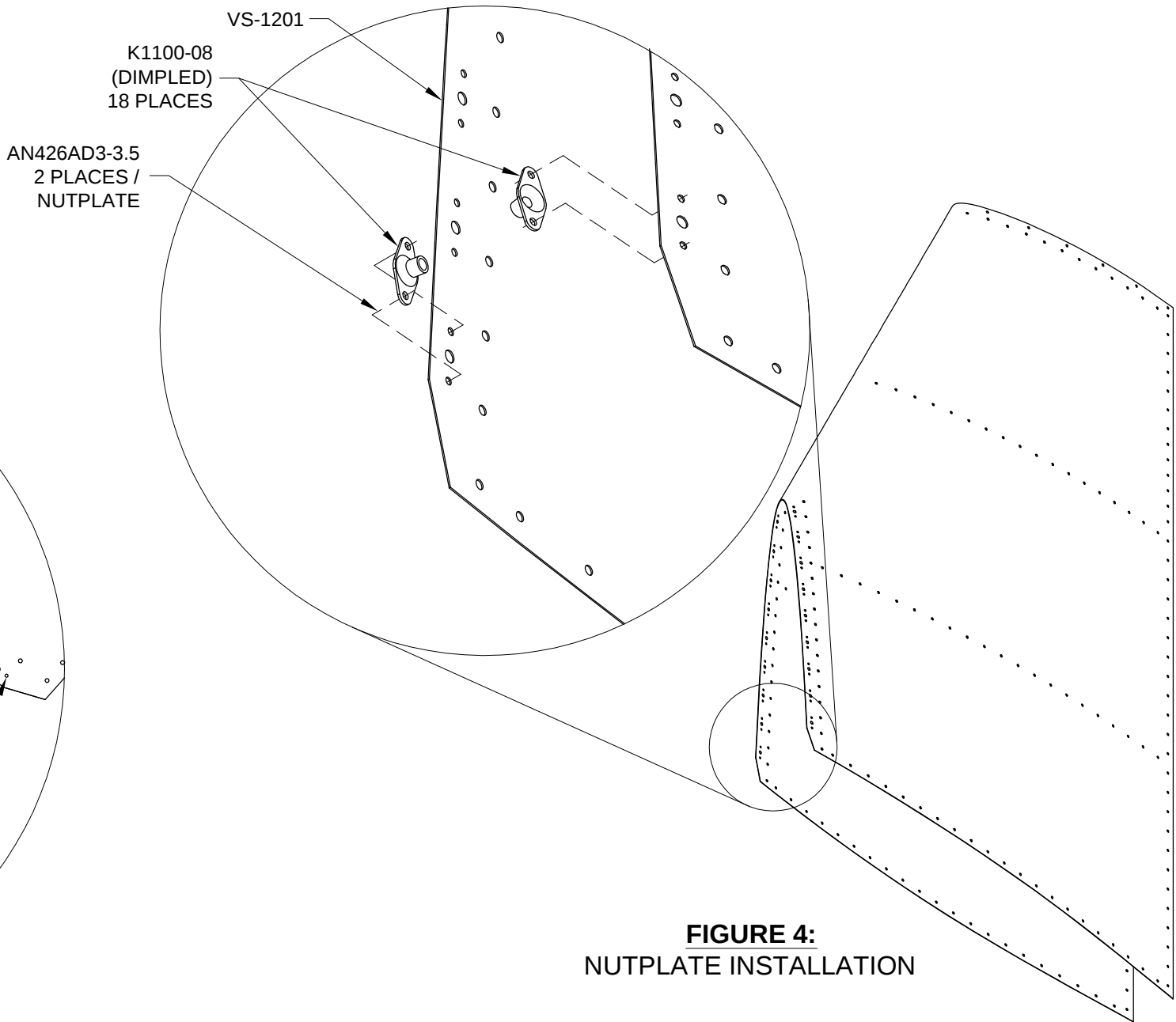
NOTE: A small diameter female die is required to dimple the nutplate attach rivet holes on a countersunk nutplate. An alternative would be grinding material from a standard female die to clear the recess of the nutplate.

Step 8: Dimple the nutplate attach rivet holes using a 3/32 dimple die as called out in Figure 3.

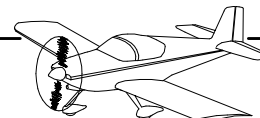


**FIGURE 3:
NUTPLATE PREPARATION**

Step 9: Rivet the previously dimpled K1100-08 Nutplates, to the VS-1201 Main Skin per call-outs in Figure 4.



**FIGURE 4:
NUTPLATE INSTALLATION**



CAUTION: Do not force fit the VS-1201 Main Skin. Align holes by adjusting the ribs of the V-Stab Skeleton.

Step 1: Cleco the VS-1201 Main Skin to the V-Stab Skeleton Assembly as shown in Figure 1. First cleco one side of the skin, then check that the narrow end of the VS-1202 Front Spar, VS-1205 Tip Rib, and VS-1206 Mid Rib will not deform the leading edge of the main skin. If any of the ribs deform the leading edge of the main skin, radius the narrow ends of the ribs (See Page 6-05, Step 1). Next, check the main skin hole alignment with the ribs on the side not yet clecoed. If holes do not align, remove the skin and adjust the ribs by additional fluting or lessening existing flutes (Section 5N) until the rib holes align with the skin holes. When all of the holes align, cleco the rest of the the main skin.

Step 2: Starting nearest to the leading edge of the VS-1201 Main Skin, remove one cleco and rivet that hole before moving on to the next hole. Continue until all of the main skin holes are riveted to the corresponding holes in the V-Stab Skeleton Assembly per call-out in Figure 1.

Step 3: Rivet the remaining open holes of the flange at the lower end of the V-Stab Skeleton Assembly per call-out in Figure 1.

Hereafter refer to this assembly as the V-Stab Assembly.

Step 4: Screw the VS-1204 Fwd Skin to the nutplates at the front of the V-Stab Assembly using the hardware called out in Figure 1. The bottom eight holes in the fwd skin are left open until the V-Stab Assembly is installed to the Tailcone Assembly.

Step 5: Bolt the Upper Hinge Assembly to the V-Stab Assembly using the hardware called out in Figure 1.

Step 6: Tie the Lower Hinge Assembly to the V-Stab Assembly through the bolt holes that will be used to attach the Lower Hinge Assembly and tape a bag of the hinge hardware to the tie. The Lower Hinge Assembly will be installed when the V-Stab Assembly is installed to the Tailcone Assembly.

NOTE: The Vertical Stabilizer fiberglass fairing installation instructions are included in Section 12: Emp Fairings.

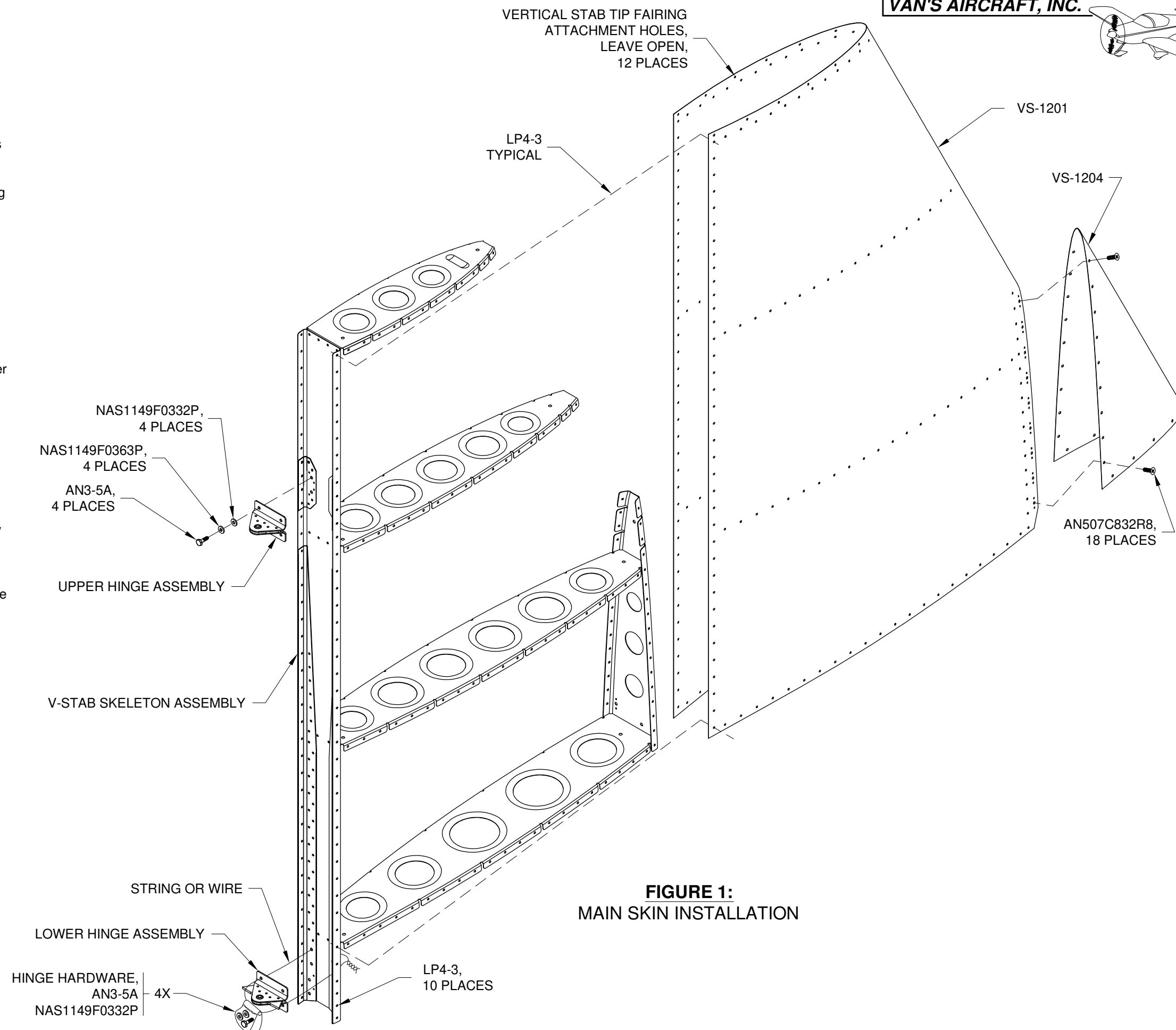


FIGURE 1:
MAIN SKIN INSTALLATION



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