

Flap Assembly

The following instructions describe the assembly of the flaps for the Murphy SR3500. The parts list on the pervious page is all the parts required to assemble **one** flap. This list should be compared to the parts received in the SR3500 kit.

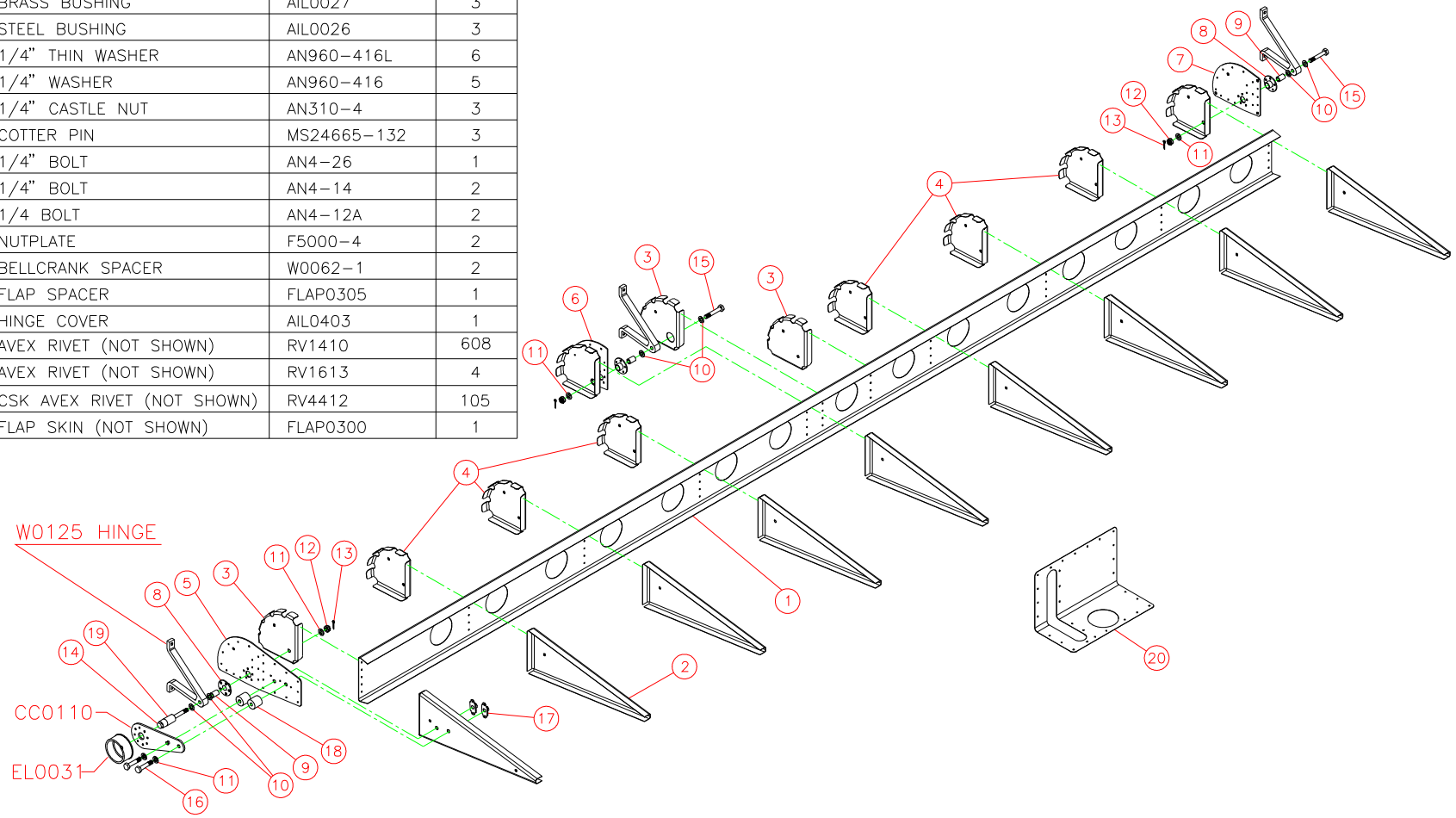
To assemble the *SR3500* Flaps you will require the following tools:

- 1) Variable speed Hand Drill
- 2) #40 and #30 & #11 Drill Bits
- 3) Quantity of 3/32", 1/8", & 3/16" Clecos
- 4) Cleco Pliers
- 5) Deburring Tools
- 6) Felt Marker
- 7) Riveter
- 8) 1/2" Drill Bit or 1/2" Template and Round File
- 9) Approximately 8 Spring Clamps
- 10) Dimple Tool

7.0 SR3500 FLAP ASSEMBLY

No.	NAME	PART NUMBER	QTY/FLAP
1	FLAP SPAR	FLAPO301	1
2	TRAILING EDGE RIB	AIL0023	9
3	LEFT LEADING EDGE RIB	AIL0022L	3
4	RIGHT LEADING EDGE	AIL0022R	8
5	FLAP HORN	FLAPO303	1
6	LEADING EDGE RIB DOUBLER (TRIMMED FROM AIL0024)		
7	AILERON END PLATE	AIL0024	2
8	BRASS BUSHING	AIL0027	3
9	STEEL BUSHING	AIL0026	3
10	1/4" THIN WASHER	AN960-416L	6
11	1/4" WASHER	AN960-416	5
12	1/4" CASTLE NUT	AN310-4	3
13	COTTER PIN	MS24665-132	3
14	1/4" BOLT	AN4-26	1
15	1/4" BOLT	AN4-14	2
16	1/4 BOLT	AN4-12A	2
17	NUTPLATE	F5000-4	2
18	BELLCRANK SPACER	W0062-1	2
19	FLAP SPACER	FLAPO305	1
20	HINGE COVER	AIL0403	1
	AVEX RIVET (NOT SHOWN)	RV1410	608
	AVEX RIVET (NOT SHOWN)	RV1613	4
	CSK AVEX RIVET (NOT SHOWN)	RV4412	105
	FLAP SKIN (NOT SHOWN)	FLAPO300	1

SR3500 FLAP ASSEMBLY (RIGHT)



7.0 SR3500 FLAP ASSEMBLY

7.1 Bushing Install

- 1) Layout all the parts in a similar manner to the exploded diagram shown in last page. The left flap will be built the same way except the Horns and Rib flanges will be reversed.
- 2) Drill and countersink four #30 holes in six Brass Bushings (AIL-27). **NOTE:** A 1/2" drill bit ground to the proper angle works well for countersinking the holes. Figure 7.1.1.

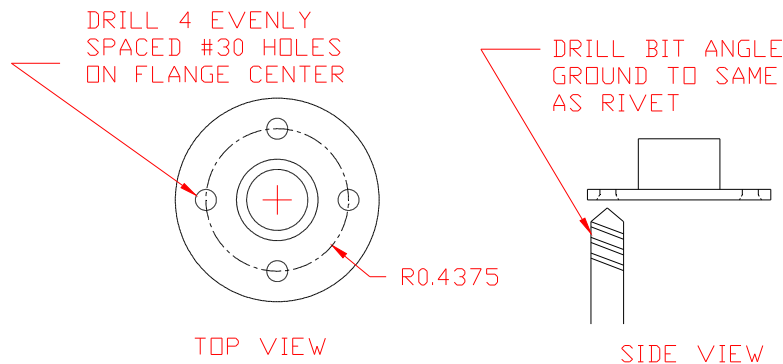


Figure 7.1.1

- 3) Prepare a Leading Edge Rib (AIL-22L) for bolt access to the Center Hinge. Cut a 1" hole centered on the pivot tooling hole in the rib in the location shown in figure 7.1.2. This can be done with a hole saw or a series of #30 holes and a half round file. This rib will be used at rib station #6.

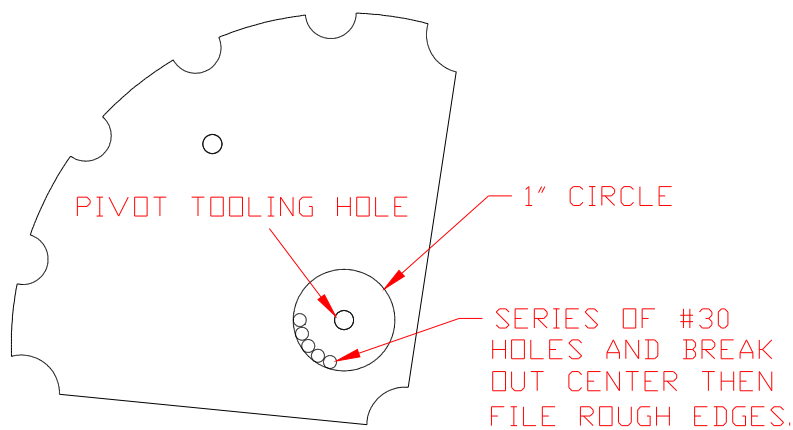


Figure 7.1.2

- 4) Prepare a Leading Edge Rib (AIL-22R) for the center Bushing assembly (leading edge rib station #5). Cut a 1" hole centered on the "pivot" tooling hole in the rib. The tooling hole is in the same location as the tooling hole shown in figure 7.1.2. **NOTE:** The oversize hole in this rib will allow the Hinge Doubler/ Bushing to move around for final adjustment.

7.2 Rib Install

- 1) Lay out all parts for Flap as in Figure 7.2.1. Make sure the rib flanges are facing the correct direction. The Main Aileron Ribs (AIL-23) are symmetrical and therefore there are no lefts and rights. The Leading Edge Ribs (AIL-22L & AIL-22R) are not symmetrical so make sure you have the correct

7.0 SR3500 FLAP ASSEMBLY

rib facing the correct direction. Rib stations 1,6 and 7 use AIL-22L and rib stations 2,3,4,5,8,9,10 and 11 use AIL-22R. See Figure 7.2.1 for rib locations. The long flange of the rib goes against the spar.

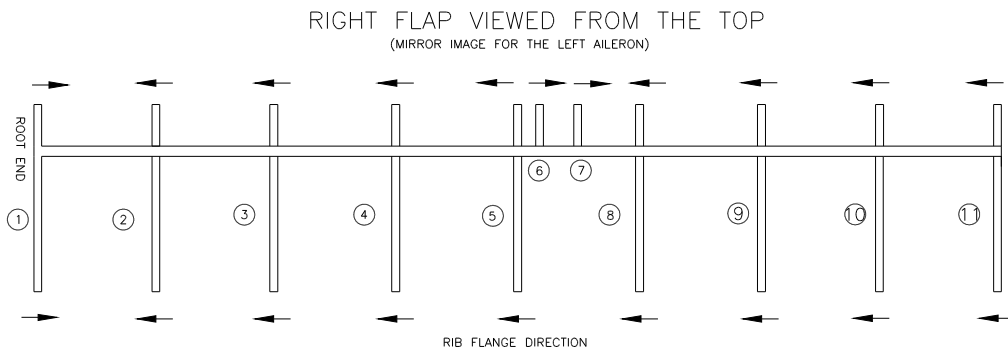


Figure 7.2.1

- 2) With a felt pen label the main ribs and rib locations on the Spar. Mark a line down the center of each rib flange.
- 3) Clamp the Spar to the edge of your table as in Figure 7.2.2.

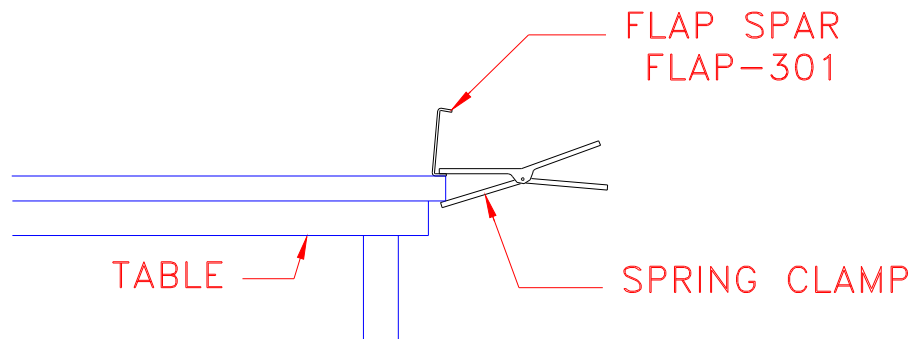


Figure 7.2.2

- 4) Place a Leading Edge Rib (AIL-22L or AIL-22R) in front of the spar as shown in figure 7.2.3. End ribs must be flush with the ends of the spar. Make sure you can see the line you drew on the rib when looking through the factory punched holes in the spar.

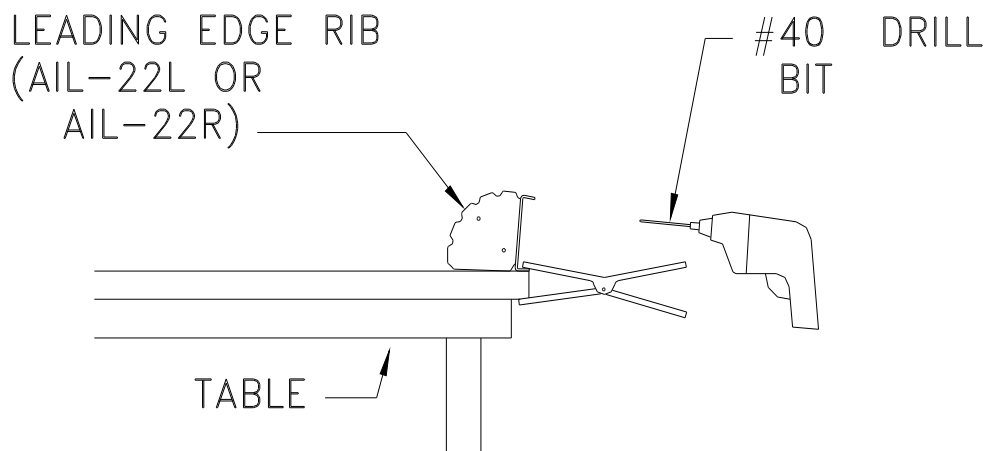


Figure 7.2.3

7.0 SR3500 FLAP ASSEMBLY

- 5) When you can see the line through the holes, drill the top hole with a #40 drill. Cleco, then drill the bottom hole and again cleco. Drill remaining holes in rib. You may wish to use a small block of wood to hold the flange of the rib in place while drilling to protect your fingers.
- 6) Repeat steps until all the Leading Edge Ribs are drilled.
- 7) Remove the Leading Edge Ribs and remove the spar from the table.
- 8) Mark and trim the main flap ribs to 12 3/8 in. as shown in figure 7.2.4.

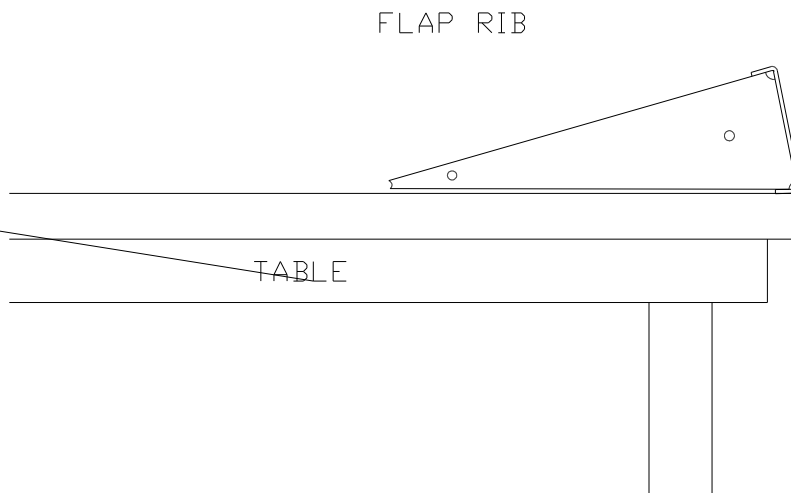
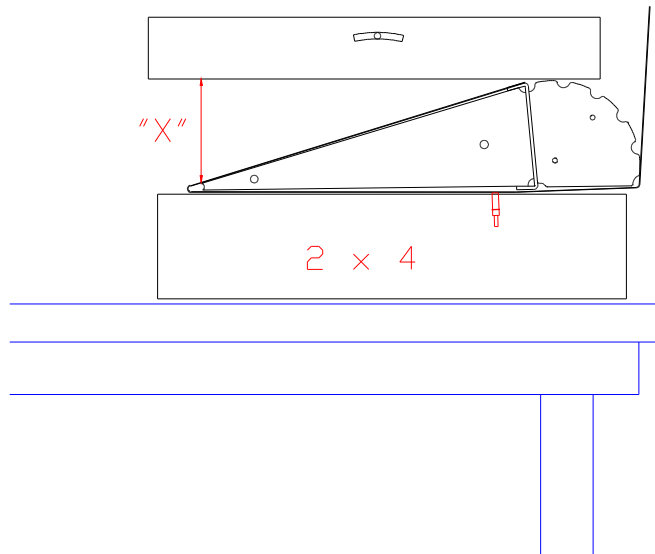


Figure 7.2.4

- 9) On the table turn the spar around and position the Main Flap Ribs (AIL-23) in place. See Figure 7.2.1 for flange direction.
- 10) Check that you can see the lines on the ribs. Then drill and cleco as you did with the Leading Edge Ribs.
- 11) Cleco the Leading Edge Ribs, the Spar and the Main Flap Ribs together and drill out all the #40 holes to #30 holes. It helps if you have an extra long #30 drill bit.
- 12) Disassemble and debur all parts.
- 13) Chromate all mating surfaces and rivet together the leading edge ribs, the spar and the main aileron ribs with 1/8" avex rivets (RV-1410). **NOTE:** Do not rivet the Leading Edge Rib to the Flap Spar at rib location #6 at this time.
- 14) Once done, repeat all the previous steps for the left flap. Remember the left flap is a mirror of the right.

7.0 SR3500 FLAP ASSEMBLY



"X" SHOULD BE THE SAME AT EACH
END OF THE FLAP

Figure 7.3.4

- 8) Lay the Flap right side up on the 2 x 4 supports. Make sure there are no clecos where the Flap is supported. Weigh the flap down at the support locations (paint cans work well) and level the structure. "X" should be the same at each end of the Flap. Figure 7.3.4.
- 9) Through the pre-punched holes in the Skin, drill and cleco the Spar/ Main Rib assembly to the Skin. Make sure the center line on the rib flanges are visible through the holes in the Skin. Work from the center of the Flap out to each end. From the Trailing Edge to the Flap Spar, drill #40 and cleco.
- 10) Attach the Leading Edge Ribs to the Flap Skin, working from the center toward each end, and from the bottom of the nose to the Flap Spar. Drill and cleco as you go. Masking tape or packing tape may be used to assist in pulling the skin around the Leading Edge Ribs. The center lines on the ribs should be visible through the holes in the skin. Use a sharp #40 drill bit and press lightly. The rib tabs bend easily. Figure 7.3.5.

7.0 SR3500 FLAP ASSEMBLY

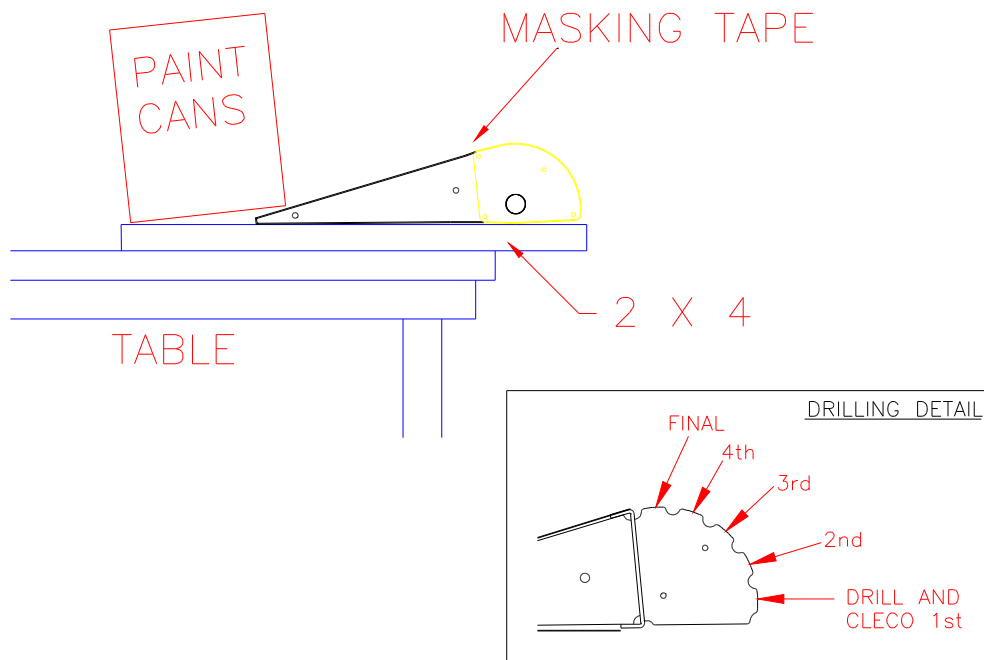


Figure 7.3.5

11) Now we will drill the spar holes. Double check the Flap for any twist. Make sure to weigh down the flap. Working from the center out to each end of the Flap, drill the top flange of the Spar through the pre-punched holes in the skin. Drill #40 in every sixth hole and cleco as you go. Drill #40 through the rest of the holes.

12) Cleco the AIL-403 Center Cover into position and then drill all #40 holes to #30.

32) Remove the Center Cover (AIL-403) and drill the hidden #40 holes to #30.

13) Disassemble and debur. Dimple the top three holes (marked final, 4th and 3rd in figure 7.3.5) closest to the spar line on every leading edge rib. Rib stations 5 and 7 must have all the leading edge holes dimpled. Figure 7.3.6.

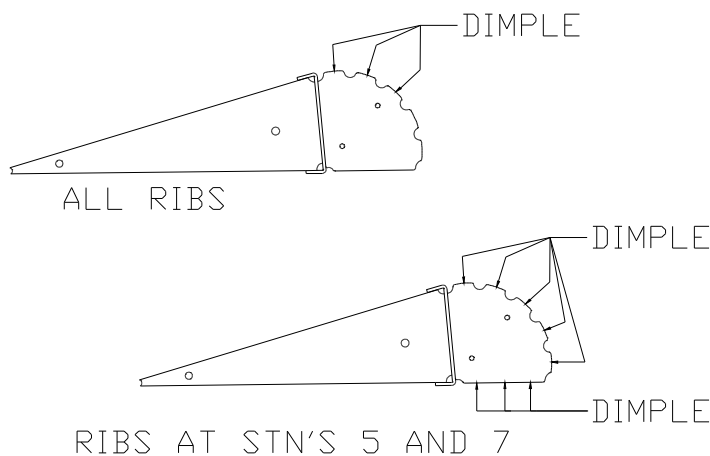
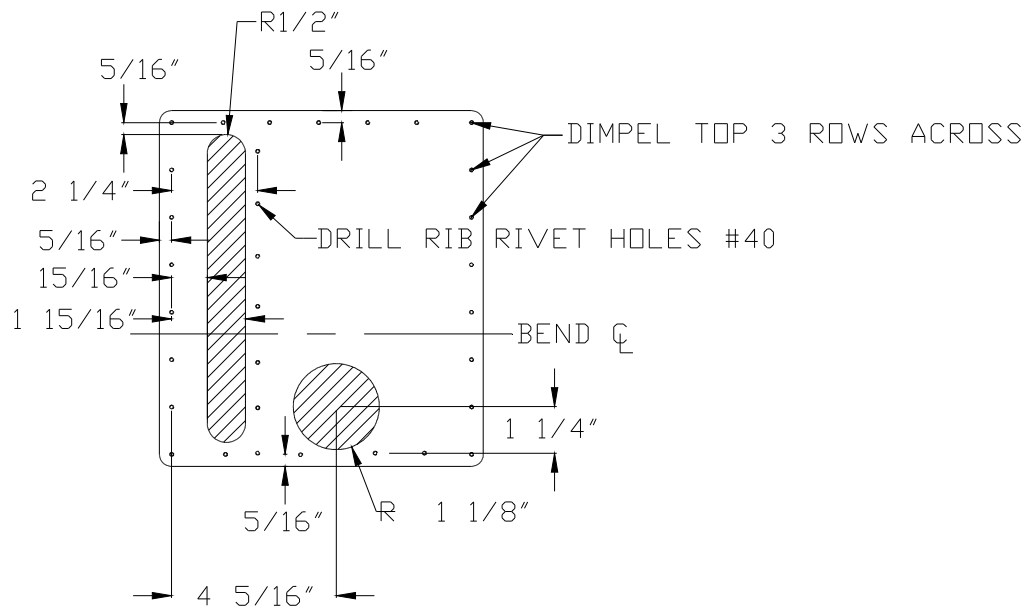


Figure 7.3.6

16) Cut a hinge slot and an access hole into the AIL-403 hinge center cover. See figure 7.3.7 for dimension details.

7.0 SR3500 FLAP ASSEMBLY



VIEW OF RIGHT AILERON/FLAP CENTER COVER
(AIL-403) FROM THE INSIDE
PART IS SHOWN FLAT FOR CLARITY
DO NOT FLATTEN
CUT OUT AS SHOWN

Figure 7.3.7

NOTE: The center hinge cover will not be final installed at this time. It will be installed after the flap has been fitted to the wing.

7.4 End Plates

1) Drill two of the pre-punched holes to #11 in the End Plate (FLAP-303). Figure 7.4.1.

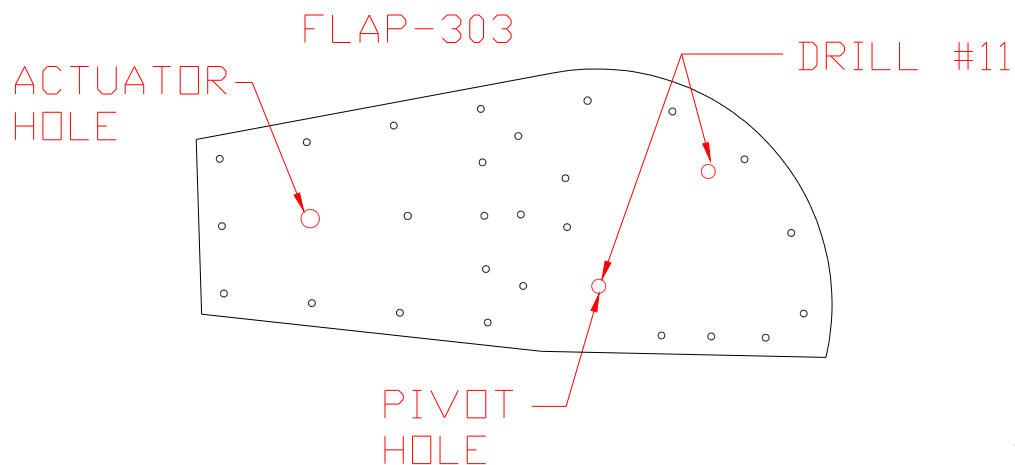


Figure 7.4.1

2) Cleco the End Plate (FLAP-303) to the root leading edge rib (rib station #1), use the #11 tooling holes. Figure 7.4.2.

3) Drill all the #40 holes to #30 through the rib, cleco as you go.

7.0 SR3500 FLAP ASSEMBLY

- 4) Drill the #11 pivot hole to 1/2". Figure 7.4.1.
- 5) Drill the actuator hole to 1/4" ensuring hole is drilled through the Flap Main Rib. Figure 7.4.1.
- 6) Install an AN4 bolt from the rib side of the 1/4" hole.
- 7) Lightly thread a F5000-4 Floating Anchor Nut onto the bolt so the rivet holes sit flush against the end plate.
- 8) Drill the two #30 rivet holes for the anchor nut into the rib and plate, remove the anchor nut and countersink the two holes on the End Plate.

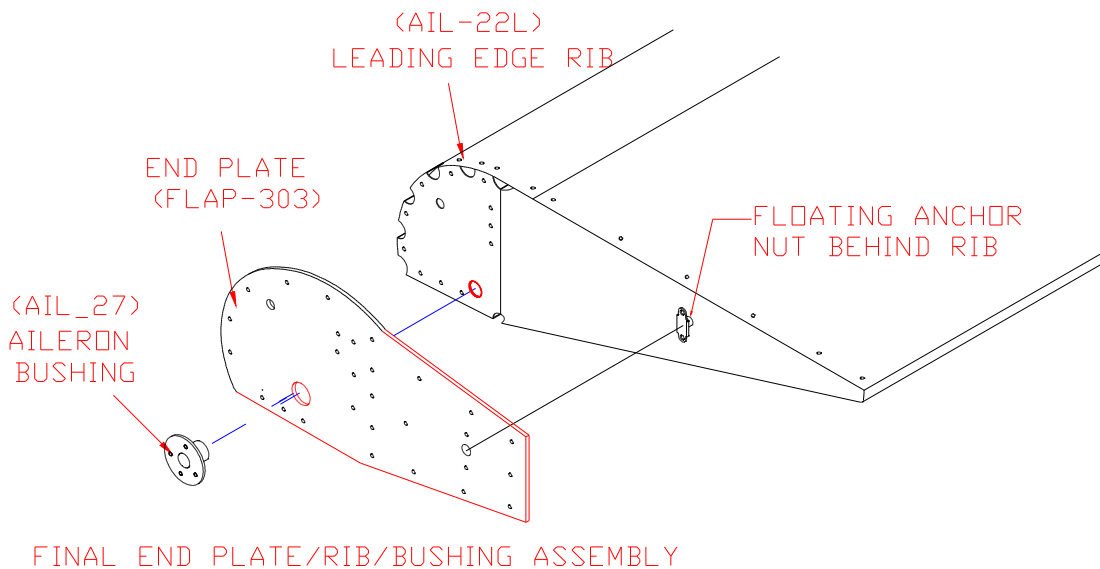
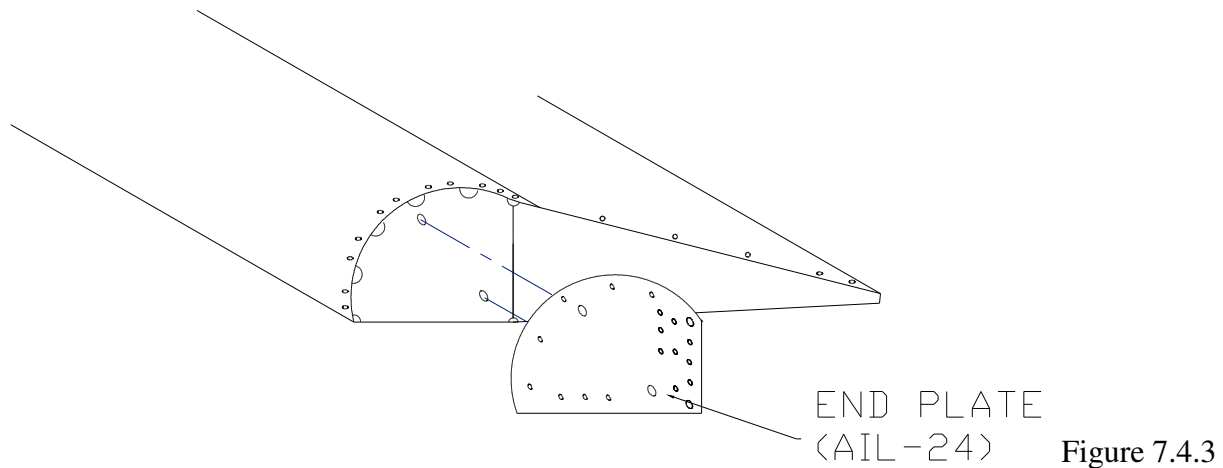


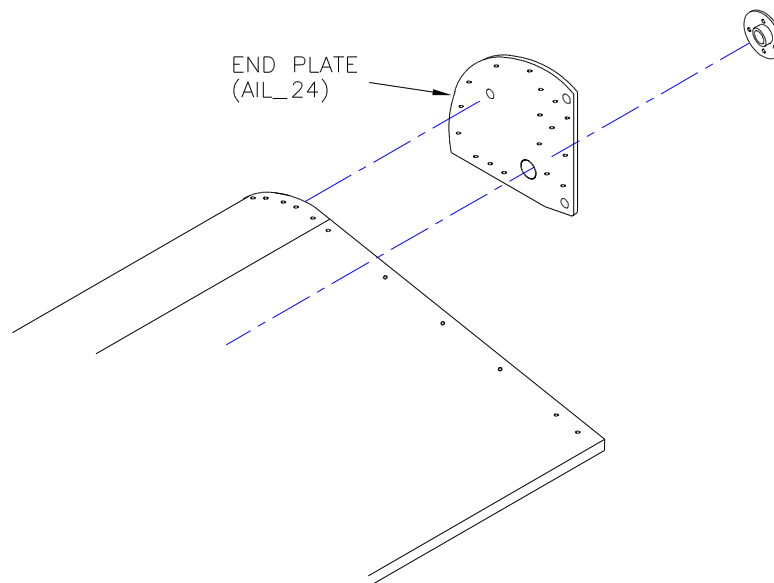
Figure 7.4.2

- 9) Insert a brass bushing (previously drilled and countersunk) into the 1/2" hole. Using the countersunk holes in the bushing, drill four #30 holes through the horn and rib.
- 10) Disassemble, debur, and chromate the mating surfaces and rivet together with 1/8" avex rivets (RV-1410). In the brass bushing use four 1/8" avex rivets (RV-4412). Rivet the nut plate with two RV4412 CS avex rivets.
- 11) Cleco an end plate to the tip leading edge rib using the #11 tooling hole (Rib station #11). Figure 7.4.3.

7.0 SR3500 FLAP ASSEMBLY



- 12) Using the end plate as a drill guide, drill all the #30 holes into the rib. Use a #11 drill bit and drill through the tooling holes in the end plate.
- 13) Remove the cleco from the pivot hole and drill out to 1/2".
- 14) Insert a brass bushing (previously drilled and countersunk) into the 1/2" hole. Using the countersunk holes in the brass bushing as a guide, drill the four holes into the end plate and rib.
- 15) Disassemble, debur and chromate the mating surfaces and rivet the bushing to the flap and endplate using 1/8" (RV-1410) avex rivets and 1/8" (RV-4412) avex rivets. Figure 7.4.4.



- 16) Remove the leading edge rib from station #6.
- 17) Chromate all Rib and Spar mating surfaces and rivet the flap skin to the rib/spar assembly with RV-1410 and RV-4412 rivets. Do not rivet station 5 nose rib.
- 18) Mount the flap assembly to the wing. Use AN4-21 bolts and AIL-26 bushings at the horn plate and outboard hinge plate. **NOTE:** The wing is upside down on the table.

7.0 SR3500 FLAP ASSEMBLY

19) Prepare a End Plate for the mid point hinge by drilling the #11 pivot hole to 1/2". This endplate must be trimmed to fit. Use the AIL-22 leading edge rib to mark the end plate for trimming. Trim 1/8" back from the mark made using the rib. Figure 7.4.5.

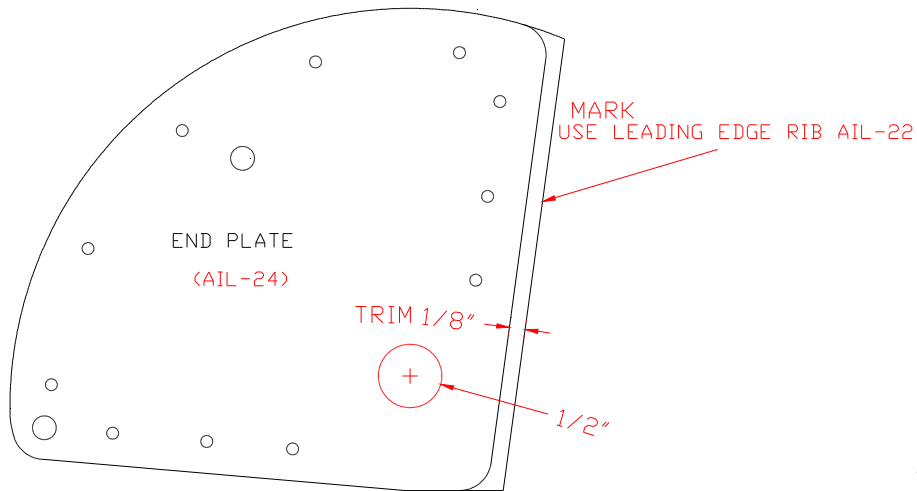


Figure 7.4.5

20) Fit the End Plate, brass bushing and the AIL-26 bushing to the center hinge leading edge rib. The hinge backing plate will find its own center. Figure 7.4.6.

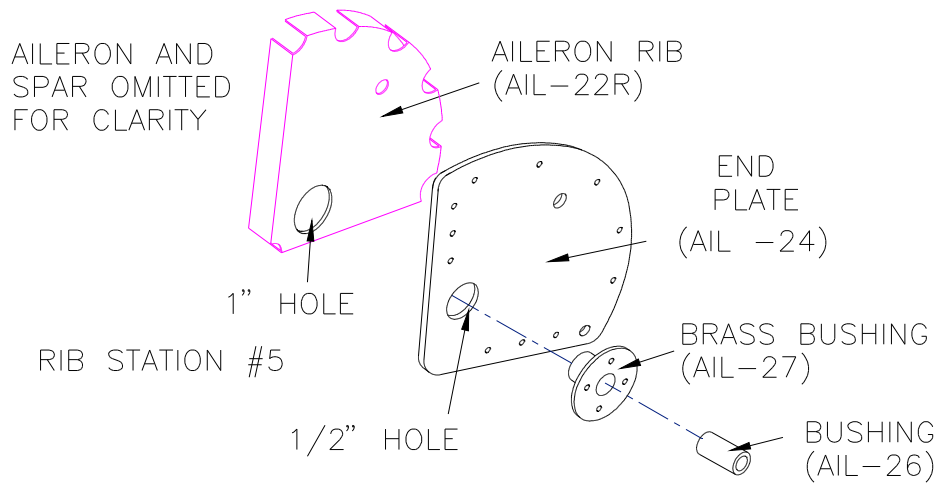


Figure 7.4.6

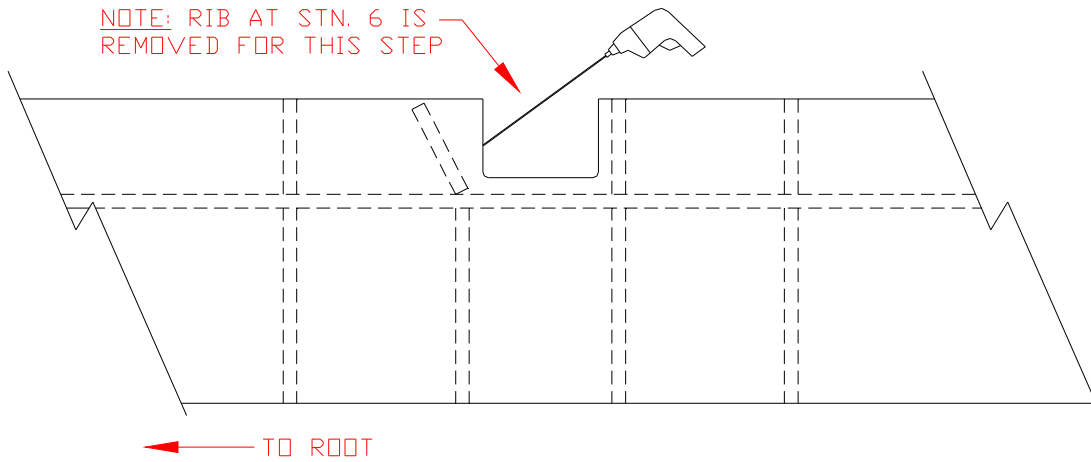
21) Fit a bolt through the flap center hinge and End Plate assembly and the wing mounted hinge.

22) Drill and cleco as many of the holes in the AIL-24 Plate as you can reach (2 or 3 is O.K.). Use a long #40 drill bit.

23) Remove the flap from the wing, bend the bushing/ end plate/ rib assembly into the flap far enough to allow drilling and riveting of the end plate and bushing. Drill the remaining holes to #40. Drill the bushing holes to #30, then drill all the remaining holes to #30. Figure 7.4.7.

7.0 SR3500 FLAP ASSEMBLY

NOTE: RIB AT STN. 6 IS
REMOVED FOR THIS STEP



VIEW OF RIGHT FLAP FROM THE TOP

Figure 7.4.7

- 24) Disassemble and debur parts. Chromate and then rivet together using 1/8" (RV-1410) avex rivets in the doubler and rib and 1/8" (RV-4412) CS rivets through the brass bushing.
- 25) Pull the rib/bushing back into position and rivet.
- 26) Re-install the station #6 rib, rivet it to the spar.
- 27) Rivet the center hinge cover plate to the flap using 1/8" (RV-1410) avex rivets.
- 28) Take a Coffee break