

RUDDER

Refer to section **2** of parts and figure drawings.

RUDDER SKIN FORMING

Use a tube with a 1 1/4" outer diameter to roll form the leading edges of the rudder skin.

1. See **FIGURE 02-01** for rudder skin bending and orientation.

CAUTION: If bent in the wrong direction, the skin must be replaced.

2. Set the tube on a table and line up the holes in the leading edge of the skin along the top of the tube.
3. Transfer drill (2) holes near the ends from the skin to the tube and cleco in place.
4. Check the alignment of the holes in the skin to the top of the tube. They need to follow the top of the tube pretty well.
5. Transfer drill and cleco the rest of the holes in the skin to the tube.
6. Clean the table to be used from debris and chips. Flip the skin/tube over and place it on the edge of the table with the clecos hanging off.
7. Drill a hole at either end of the 1 1/4" O. D. tube outside diameter and insert a screwdriver or anything handy to be used for leverage.
8. This will probably take 2 people. Force the tube down toward the table and rotate the tube to roll the skin tightly around the tube. Roll all the way until the clecos are about 90° to the table. When finished, the skin should be bent to 85-90°.
9. Repeat this process to form the other leading edge of the rudder skin.

RUDDER ASSEMBLY

1. Press the bronze flange bushings into the hinges before assembly. See part drawing for orientation. Ream the bushings to #11, if a 3/16" bolt will not insert into the bushings. 8/15/26
2. Draw a line down the un-drilled flange of each rib. This line should be equal in dimension to the edge distance of the pre located holes that are provided on the drilled side of the rib. 8/15/26
3. Cleco and rivet the Rudder Spar, Upper Rudder Ribs, and Hinges together as shown in the PARTS MANUAL DRAWING.
4. Fabricate rudder stop bushings and assemble as shown in PARTS MANUAL DRAWING.
5. Using the Rudder Horn Mount Tube as a guide/template, enlarge the provided #30 size holes to #11. This will ensure that all 3 holes will match the welded mount tube correctly.

6. Cut and deburr the bend tags on both ends of the Rudder Skin.
7. Cleco the rudder skin to the Left side of the frame assembly. The leading edges of the skin curl around to meet each other. Do **NOT** cleco the leading edge at this time.
8. Cleco and rivet the rudder horn rib doubler to the lower rudder rib.
9. Insert the lower rib, with doubler, into the bottom of the rudder and cleco it in place above the tang on the rudder horn mount tube.
10. Cleco and rivet left side of Rudder Skin to Ribs and Spar. Place Rudder, Left side down on a flat surface and check for twist. Make sure Spar and Ribs are straight. Use center line on the Rib flange as a guide to check alignment with side skin holes.
11. Check the rudder for twist. If needed, use boards and weights or straps to fix the assembly and correct any error in twist. Transfer drill from the skin to the un-drilled flange of the spar and ribs. Cleco as you drill.
12. Transfer drill #11 through the rudder horn mount tube to the lower rib, and rivet.
13. Rivet the skin to the frame/ribs and finish with the leading edge. Drill the leading edge holes #30.
14. Use a scrap piece of wood to slightly bend the edges of the skin around the spar at the very bottom near the hinge. The purpose is to ensure the edge of the skin does not contact the vertical stabilizer skin and to reduce drag slightly.

RUDDER TO VERTICAL STABILIZER ATTACH

NOTE: The rudder must be installed onto the vertical stabilizer before the whole assembly is mated to the tailcone. The horizontal stabilizer must be mounted before the vertical/rudder assembly is bolted onto the tailcone as the horizontal stabilizer will not slide into place with the rudder present.

1. Ensure the bronze flange bushings are in place on both the vertical stabilizer and rudder sides of the hinges. Ream the bushings to #11, if a 3/16" bolt will not insert into the bushings.
2. Slide the rudder into place on the vertical stabilizer and use bent needle nose pliers or similar to insert the bolts into the hinges with the bolt heads on the top. Take care not to ding or mar the skins.
3. Use the appropriate hardware to secure.
4. Once the rudder is mounted to the vertical stabilizer, the vertical stabilizer tip may be fit up.