

Challenger II

LSS-XL-65

LSS-XS-50

Section II Wings

Instruction addendum

This wing manual is an addendum to the LSS manual to show the differences in the LSS wing and the XL-65 / XS-50- wings with 1/3 span wing tanks. This should not be confused with other wing tank installations from other sources. The method shown in these instruction, photos and drawings will allow gross weight to be increased on these two new models of the popular Challenger II Light Sport Special and Challenger II long wing Light Sport Special. For structural reasons you must not deviate from the methods and parts shown in this manual and picture CD



LSS-XS-50 with Rotax 503 (52 hp) represented in this photo.

Section II - XL/XS inventory

Wing box

() () 2	XL/S-2W-100 L & R	Wing panels (Left and Right) (XL = 14ft., XS = 12ft.)
() () 2	XL/S-100 L & R	Aileron Assy's (Left and Right) (XL = 14' XS = 12' nom.)
() () 1 SET	2RB1X	Wing ribs, top (XL = 30, XS =26)
() () 1 SET	2RB2X	Wing ribs , bottom (XL = 18, XS = 16)
() () 2	2RB2X-T-44	Tank short rib (1/2" tube x 44" machined at one end)
() () 4	LSS-BRC2	Bottom rib channels
() () 1 SET	LEW-STIF-SET	Leading edge wrap stiffener U-channel (24' random lengths)
() () 1 SET	XL/S-LEW-CH	Leading edge wrap channel set
		(XL = 2 @ 73", 2 @ 38", 2 @ 28") (XS = 2 @ 61", 2 @ 26", 2 @ 28")
() () 1 SET	RB-WEB-SET	Wing tip, wing root and tank rib bay webs (16 pcs total)

NOTE: Leading edge wrap channels for XS-50/65 without tanks are 2 @ 61" and 2 @ 73"

Sect. II parts box

() () 1	QT-PT	Poly-Tac adhesive, quart.
() () 1	QT-MEK	Methyl Ethyl Keytone, quart.
() () 4	SF-XL/S-WING FAB	Wing fabric 2 pkgs. (XL= 15 ft., XS = 13 ft)
() () 2	SF-XL/S-AIL FAB	Aileron fabric, (XL= 19" x 12 ft. XS = 19" x 10 ft)
		(All fabric is Superflite 1.8 oz.)
() () 4	LSS-W5X	Flat sheet Alum. 8" x 62"
() () 4	W5X	Flat sheet Alum. 6" x 62
() () 1 SET	XL/S WRB	Wing root braces (4 pcs total) #1L, #1R, #2L, #2R
() () 1 SET	TANKHRDWR	Wing tanks hardware set (includes fuel line, fittings, filler necks tank caps, hose clamps, Permatex sealant & all hardware.
() () 1 SET	W1XX	Wing rib gussets (XL = 36, XS = 32)
() () 1 SET	W1X	Wing rib gussets (XL = 36, XS = 32)
() () 8	A-007	Aileron hinge
() () 8	WS1	Strut attach bracket (.090 - 2024-T3 Alclad)
() () 4	AN3-23A	Bolt 3/16", for rear strut attach bracket.
() () 4	AN3-24A	Bolt 3/16", for front strut attach bracket
() () 8	AN365-1032	Nyloc nuts, 3/16
() () 1 BAG	SSD42SSBS	S.S. rivets 1/8" x 1/8" (shorts) (XL=1200, XS=1100)
() () 1 BAG	SSD44SSBS	S.S. rivets 1/8" x 1/4" (longs) (XL=350, XS=320)
() () 1 BAG	AD44ABS	120 Alum. Rivets 1/8" x 1/4" (longs) for wing tips
() () 1 BAG	AD42ABSLF	Alum. Rivets 1/8" x 1/8" large flange (XL=264, XS=220)
() () 12	AD64ABS	3/16 Alum. Rivets 3/16" x 1/4" (longs) for wing tips at spars

Packed in separate box

() () 2	WT-002	Fiberglass wing tips. (Left and right)
() () 2	WT-R	Wing tip filler rib
() () 2	Fuel Sender-12"	Fuel sender

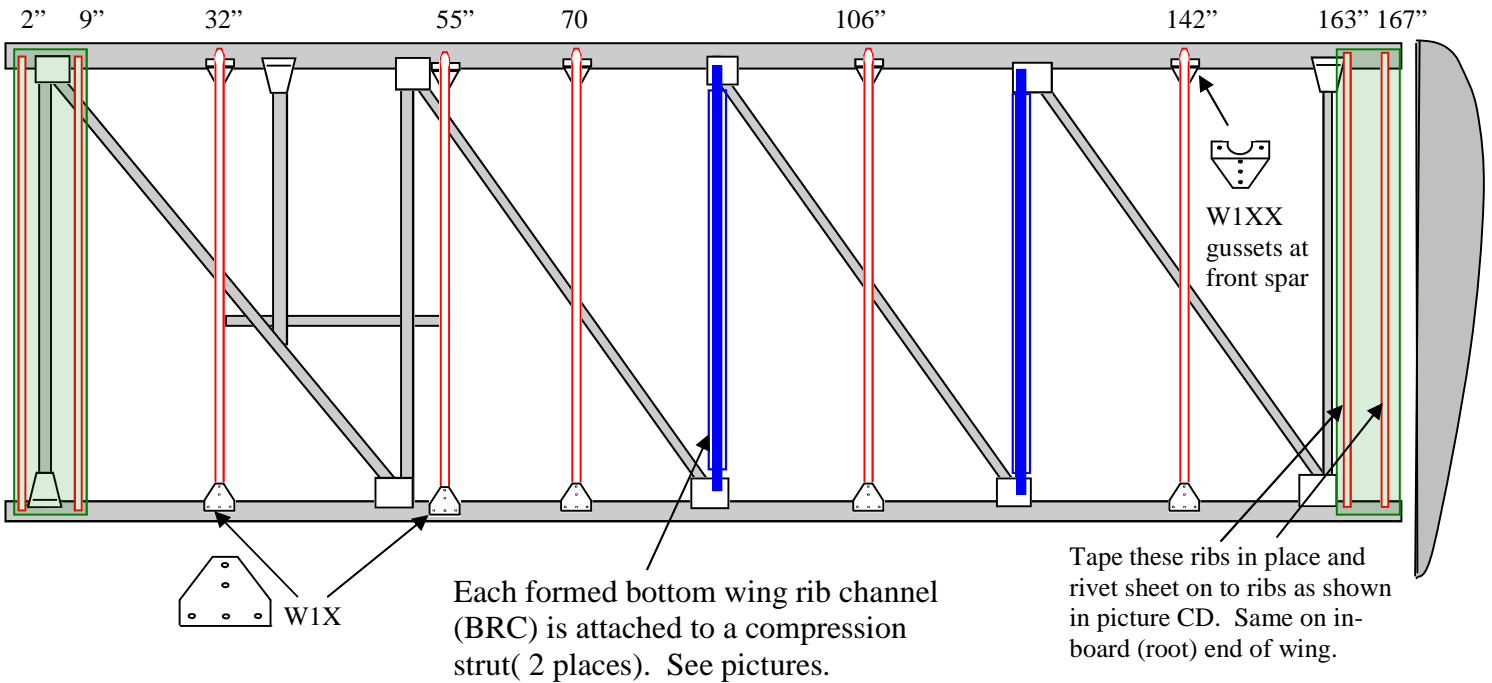
Wing tank box

() () 2	10 GAL POLY TANK	Polypropylene wing tanks
() () 2	XL/S-WTC -R/L	Wing tank cover (left and right)
() () 4	WTC-STF	Tank bay stiffener tubes (1/2' x .035 x 23' tubes)
() () 2	XL/S-TB-ANGL	Tank brace angle mtrl. (1' x 1' x .125 6061-T6)
		(2 pcs at 23.5" and 2 pcs. at 8")

LEFT XL (long wing bottom)

From end of spar.

↑
FRONT

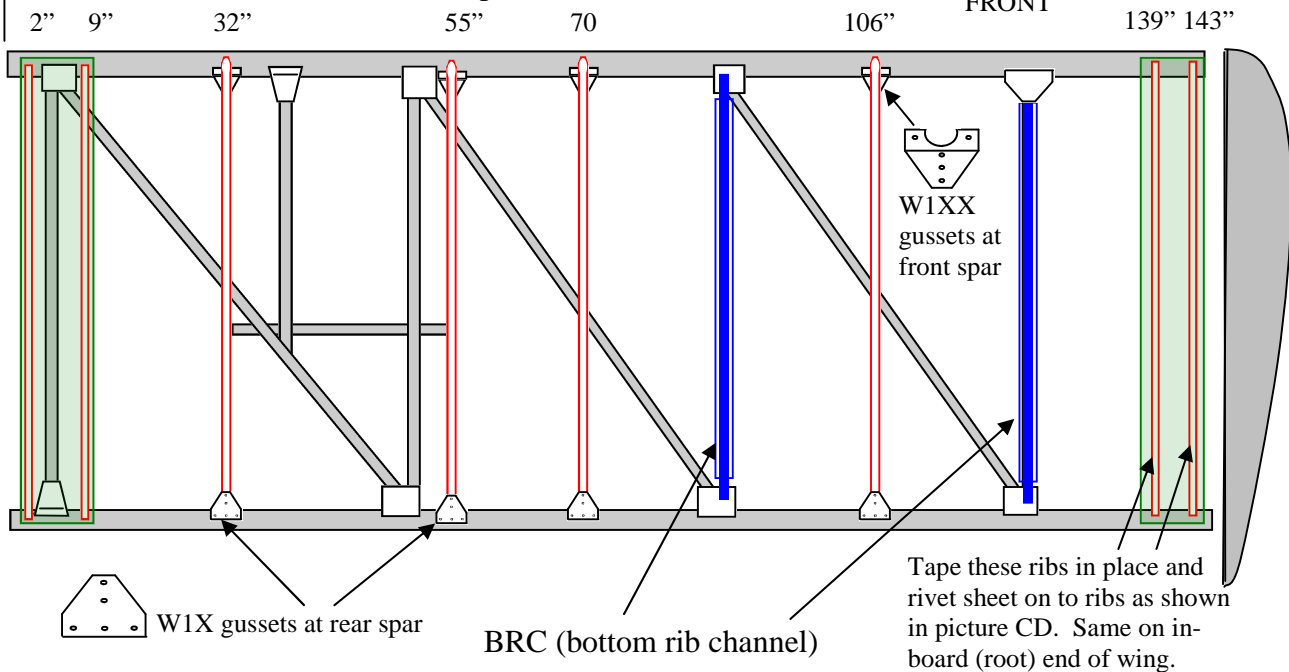


USE SS-44 RIVETS INTO WING SPARS AND SS-42 RIVETS INTO RIBS, EXCEPT USE 1/8 X 1/4" ALUMINUM RIVETS IN FIBERGLASS WING TIP

LEFT XS (short wing bottom)

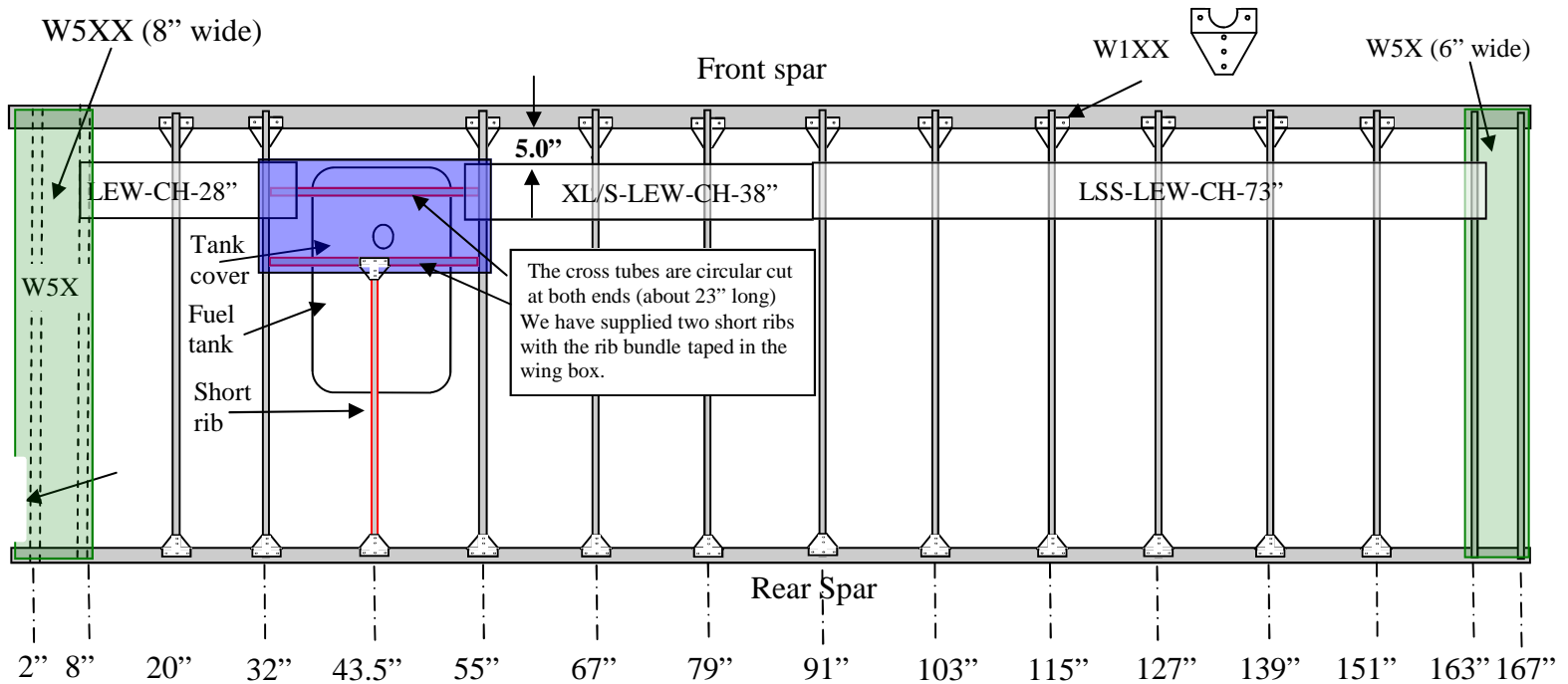
Bottom ribs measured from end of spar.

↑
FRONT



The assembly of the shorter XS-LSS wing is the same as the long wing XL-LSS but with one less bottom rib. Bottom ribs in red.

XL LSS LONG WING (TOP VIEW)



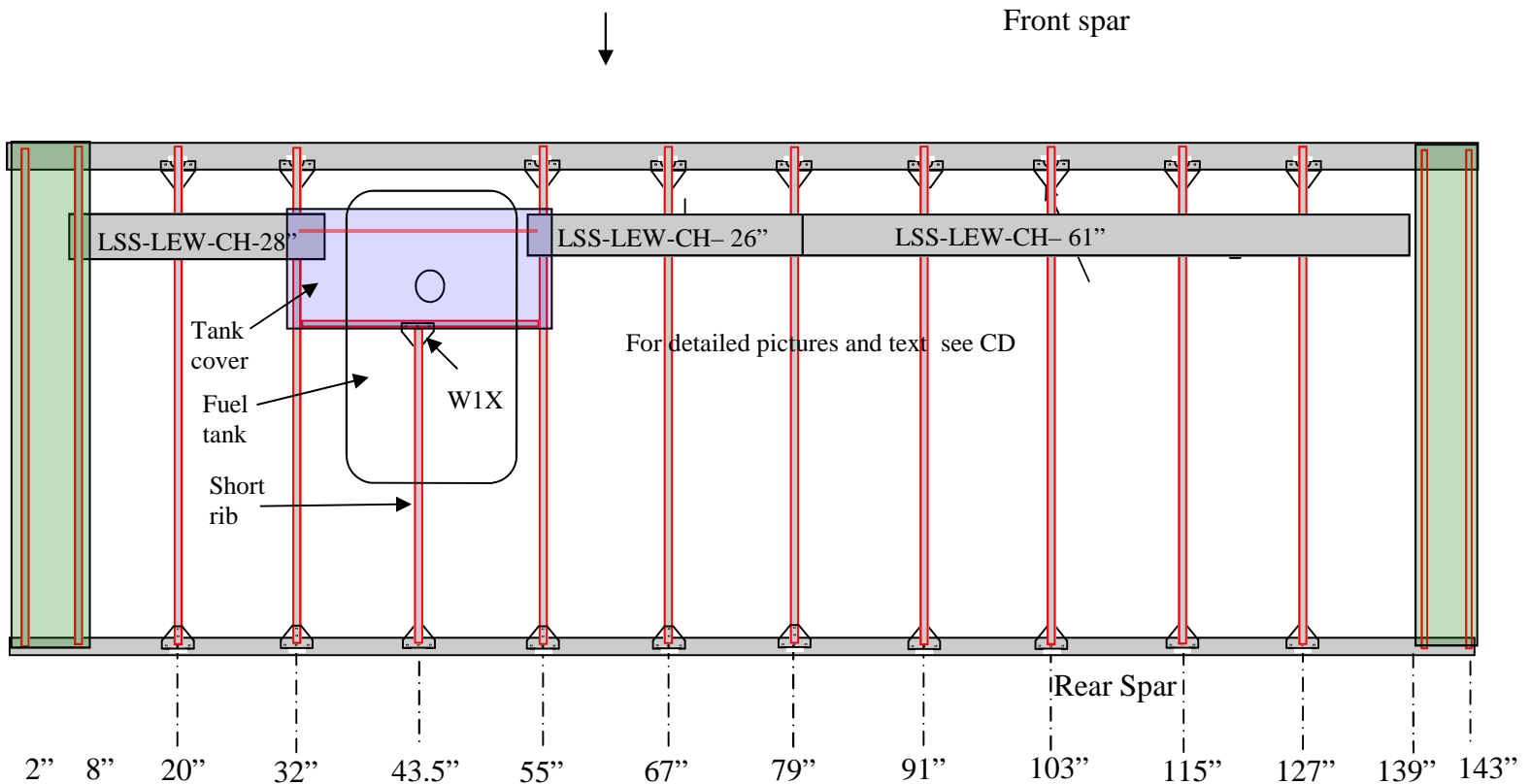
Mark front and rear wing spars with sharpie marker on these measurements taken from the inboard end of the wing spar. - Wing ribs to be centered on these marks.

**USE SS-44 RIVETS INTO WING SPARS AND SS-42 RIVETS INTO RIBS,
EXCEPT USE 1/8 X 1/4" ALUMINUM RIVETS IN FIBERGLASS WING TIP**

Installation sequence:

1. Insert ribs into channel holes—Debur 1/2" holes first. See pictures on CD.
2. Rivet Front of Ribs to spar (at the tips of ribs) Tape the rear of the ribs to spars for now.
NOTE: THE WRAP DOES NOT COVER THE LAST OUTBOARD OR INBOARD RIBS
3. Rivet W1XX gussets to ribs and spars on front spar and W1X flat gussets at rear spar.
4. Slide LEW channels into place so front of wrap channel is 6" from the tip of the ribs.
5. Install all rib webbing on root end, wing tip end and tank bays. Trim where needed.
6. Install W5XX (root end of wing) and W5X (wing tip end of wing)
7. Install fiberglass wing tips
8. Install tanks, fittings, fuel lines, gas filler neck etc etc. See separate instruction with tank.

RIGHT XS-LSS (SHORT WING)- TOP



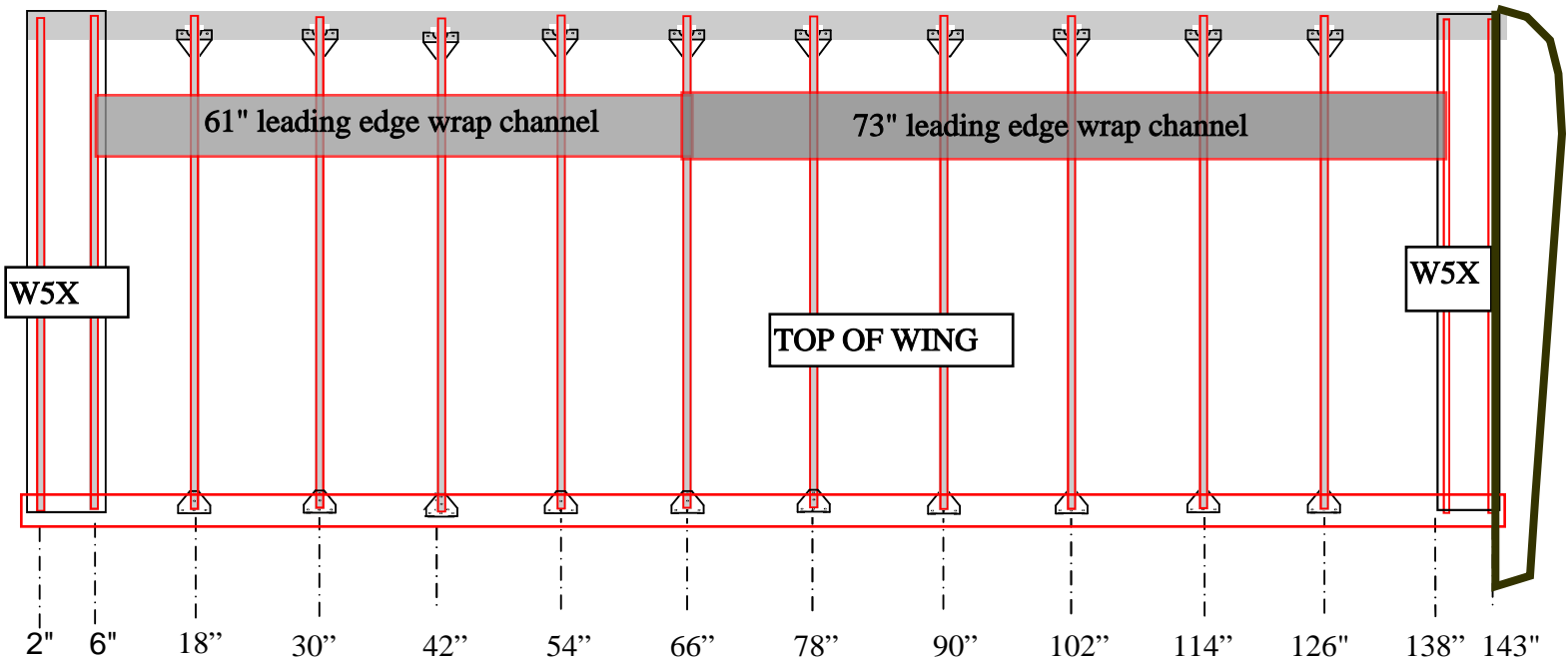
Mark front and rear wing spars with sharpie marker on these measurements taken from the inboard end of the wing spar. - Wing ribs to be centered on these marks.

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5. Install all rib webbing on root end, wing tip end and tank bays. Trim where needed.
6. Install W5XX (root end of wing) and W5X (wing tip end of wing)
7. Install fiberglass wing tips
8. Install tanks, fittings, fuel lines, gas filler neck etc etc. See separate instruction with tank.
9. After complete installation of tanks, install the tank cross braces, short rib and tank cover.

This drawing is for the XS-50 WITHOUT WING TANKS.

This wing is built similar to the LSS wing except with full span ailerons, 6" W5X strips at both ends of the wing. XL root end stiffener peices are not used but instead use the material as provided in the LSS wing to fashion stiffener for inboard and outboard wing ends.

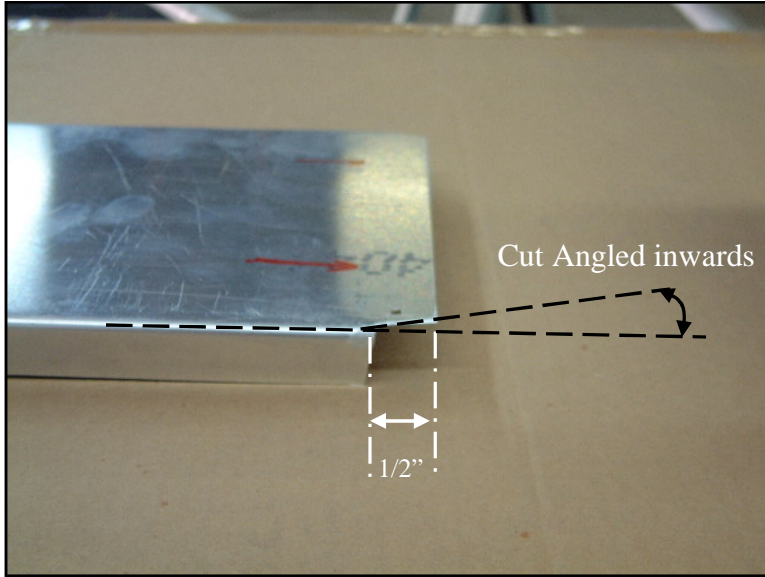


Mark front and rear wing spars with sharpie marker on these measurements taken from the inboard end of the wing spar. - Wing ribs to be centered on these marks.

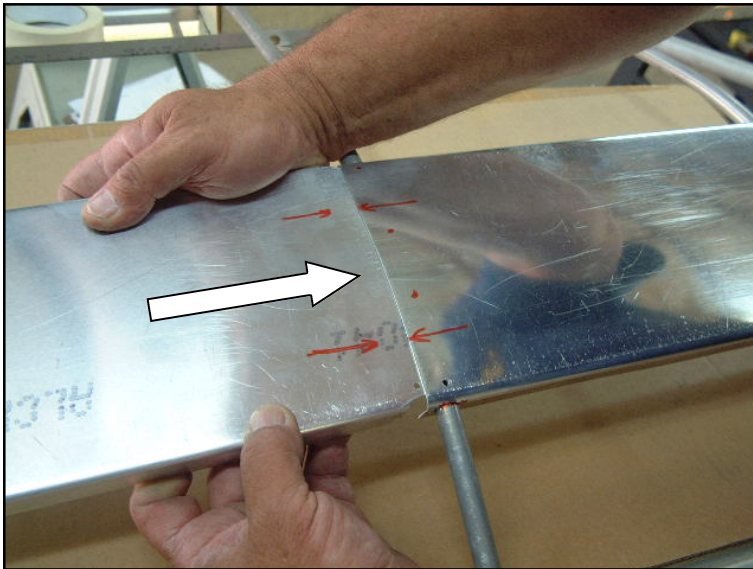
1. Insert ribs into channel holes—Debur 1/2" holes first. See pictures on CD.
2. Rivet Front of Ribs to spar (at the tips of ribs) Tape the rear of the ribs to spars for now.
3. Rivet W1XX gussets to ribs and spars on front spar and W1X flat gussets at rear spar.
4. Slide LEW channels into place so front of wrap channel is 6" from the tip of the ribs.
5. Install all rib tip and root bracing as in LSS model.
6. Install W5X top pieces top and bottom (root end and wing tip end of wing)
7. Install fiberglass wing tips . See wing tip picture file

Bottom of each wing panel wing uses 4 bottom rib channels (BRC) and 7 round bottom ribs (2RB-2X) as in the CH2 Clipped wing with bottom ribs option (see packing list). Wing tank rib webs are not used in this wing. Wing root and tip rib webs are provided and installed as in XL/XS instructions as well as the fiberglass wing tip and W5X sheets as shown in this drawing. Ailerons are the same as in XL/XS with wing tanks.

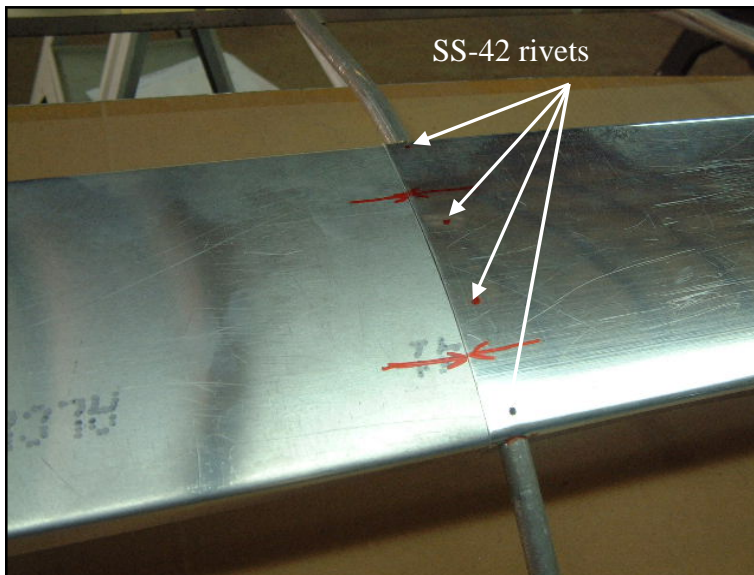
How to connect the LSS LEW Channel sheets



Trim the end of the LSS LEW Channel sheet as shown. Only ONE end requires trimming

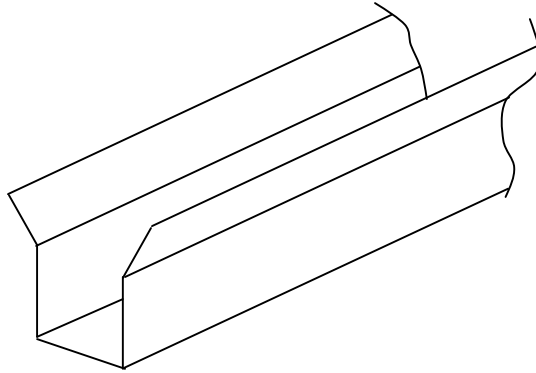


Slide the trimmed end UNDER the previously installed LSS LEW Channel sheet



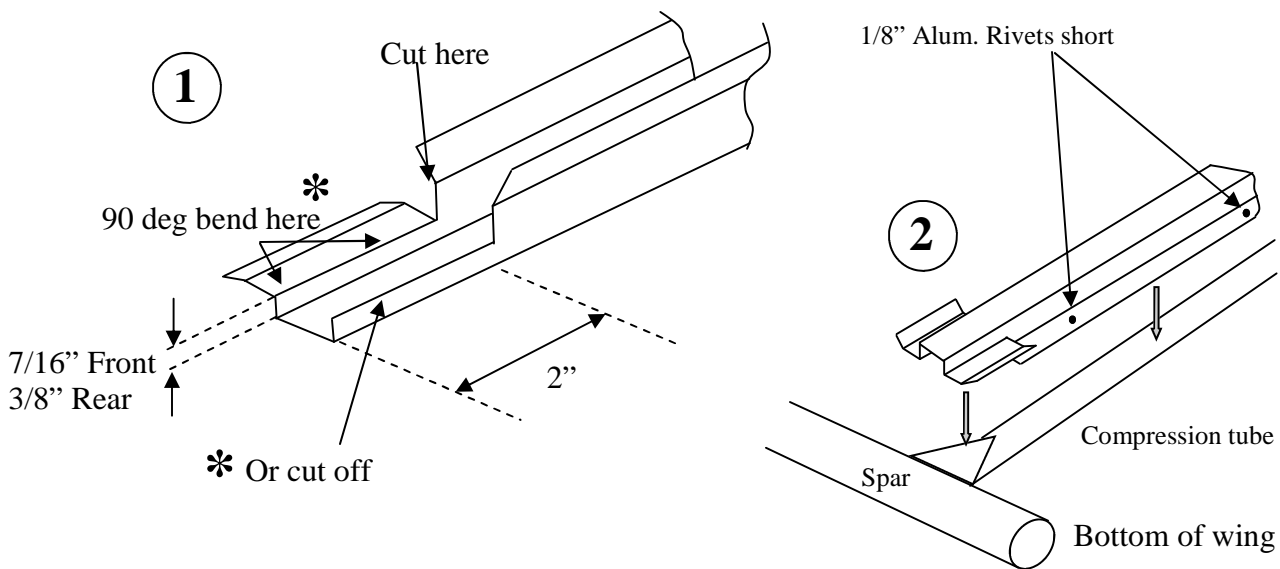
Once the joint is square and all looks good, rivet the two LSS LEW Channel sheets together onto the rib.

Formed bottom wing rib (LSS-BRC)

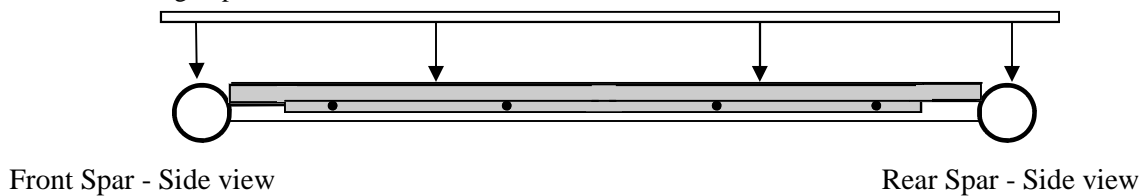


This formed bottom rib channel is to be installed over the wing compression tubes (4 per wing panel) to hold the bottom fabric from pushing up against the compression and drag/anti-drag tubes.

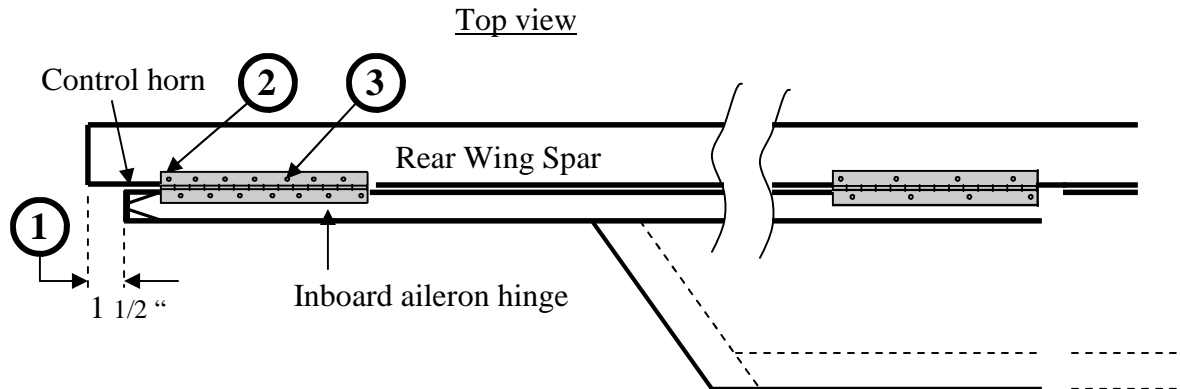
Regular round tubing ribs (3 per wing panel) will be installed half way between each wing compression tube with the same gussets used on the top wing ribs.



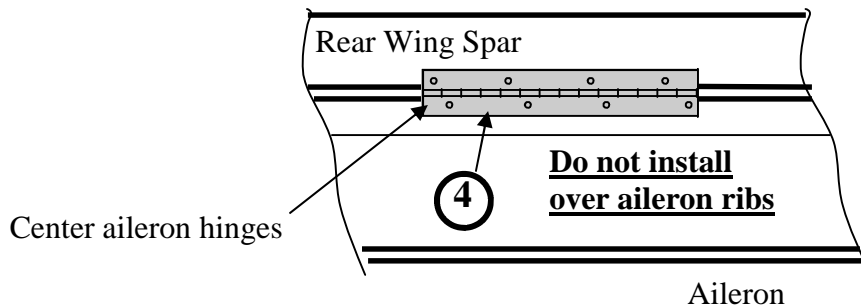
3 Use a straight edge to level the bottom wing rib channel before riveting in place.



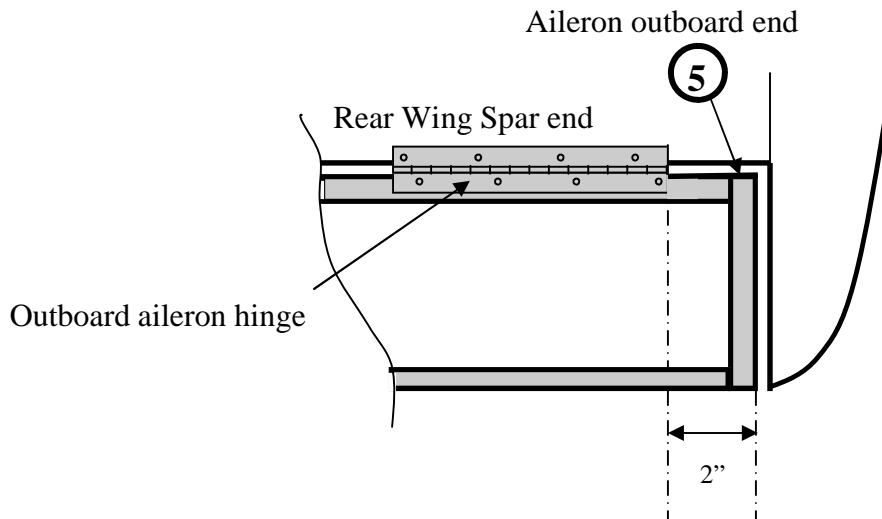
How to install Aileron hinges - Hinge location



1. End of aileron spar must be one and one half inch from end of wing spar.
2. Inboard hinge should be as close to control horn as possible.
3. Stagger rivets to allow more aileron travel.

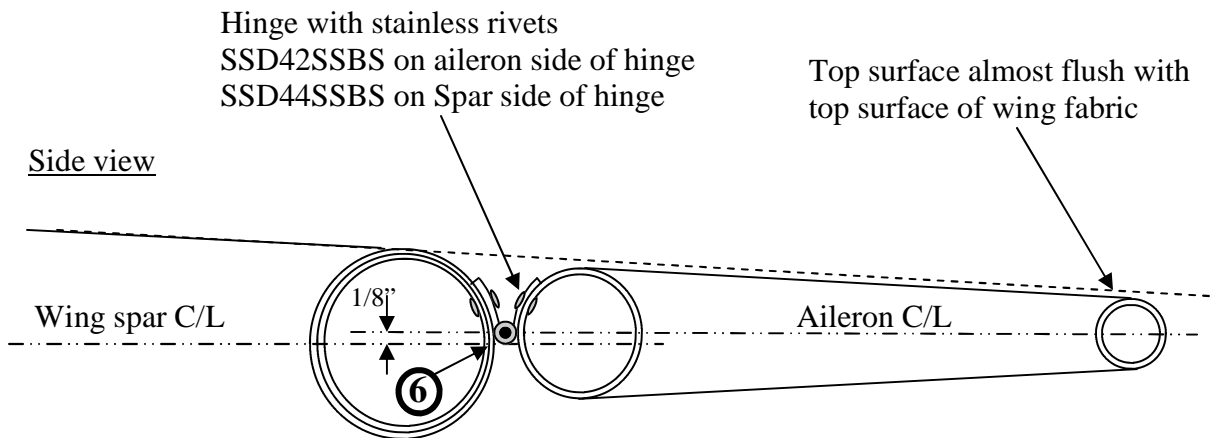


4. Four rivets per side on all hinges except inboard hinge; which gets eight per side. The two center hinges must be spaced evenly between inboard and outboard hinges without interfering with ribs or wing strut brackets.
5. Outboard hinge should be 2" from end of aileron.



How to install Aileron hinges - Hinge location

Side view

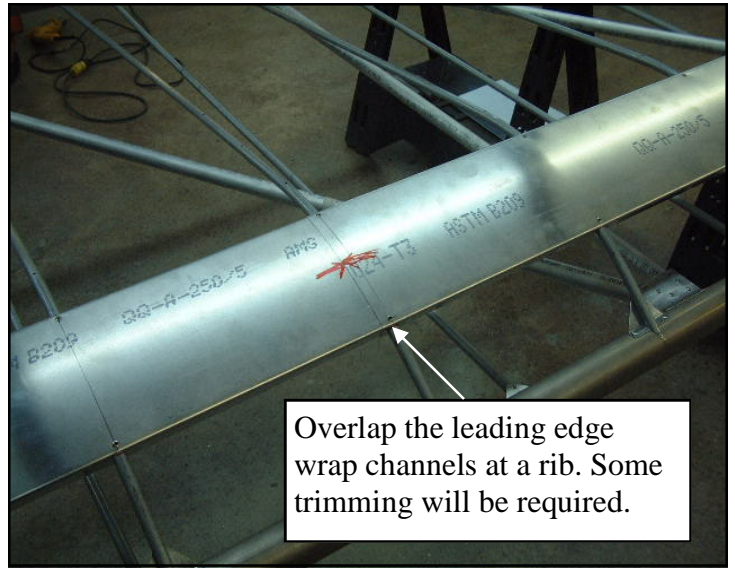


Try for 30 deg up and down aileron deflection

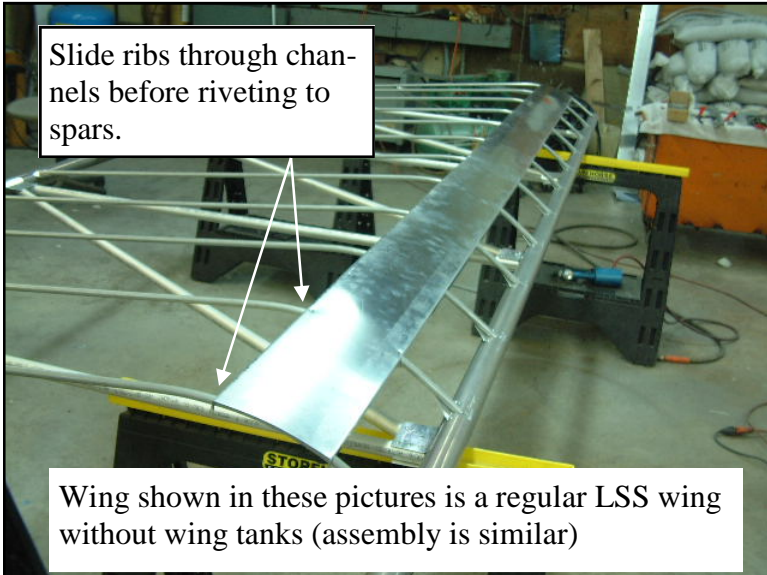
6. Center of hinge should be on the center line of AILERON. The bottom of the hinge barrel should be on centerline of the WING SPAR. See above drawing.



Rivet ribs to spar at marks. Make sure you slide the ribs through the wrap channel first !!

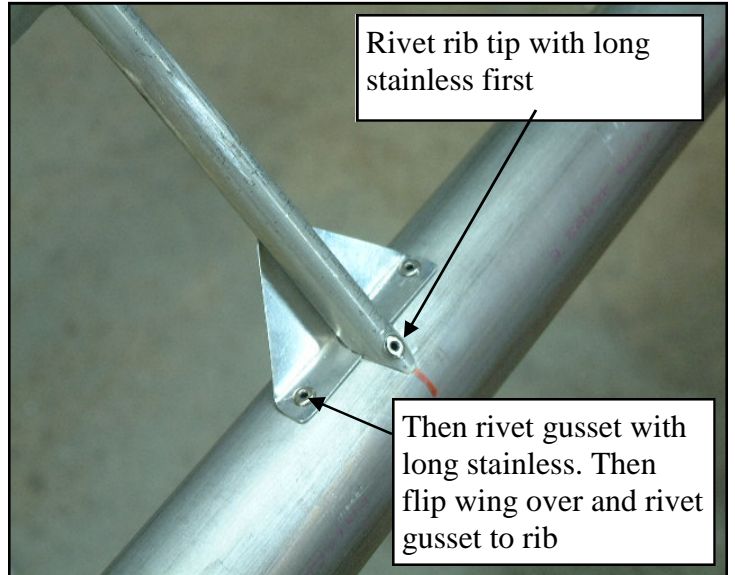


Overlap the leading edge wrap channels at a rib. Some trimming will be required.



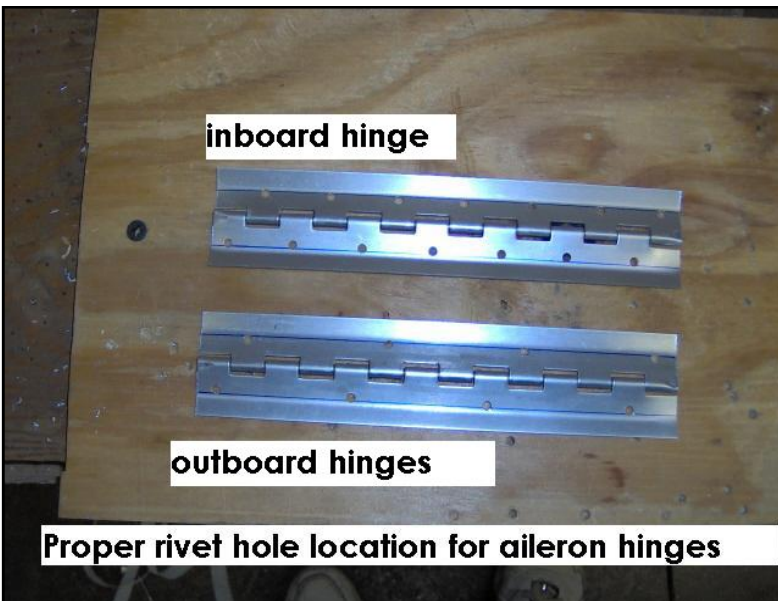
Slide ribs through channels before riveting to spars.

Wing shown in these pictures is a regular LSS wing without wing tanks (assembly is similar)



Rivet rib tip with long stainless first

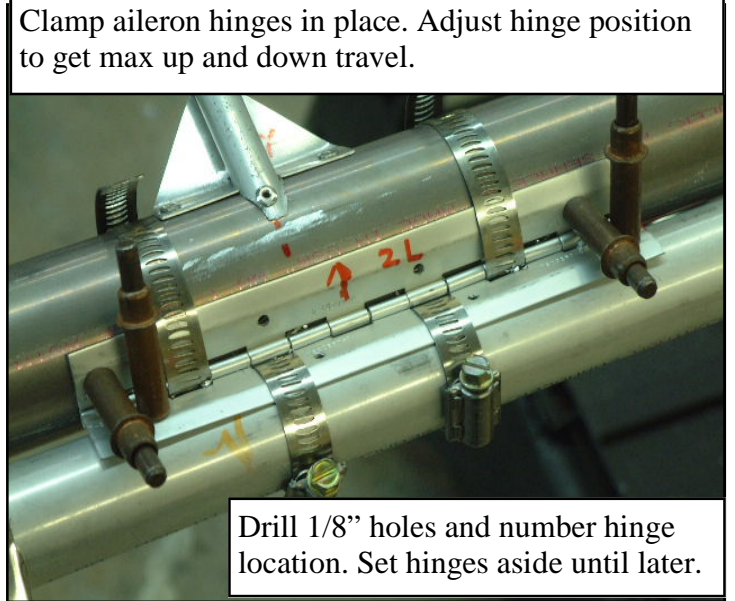
Then rivet gusset with long stainless. Then flip wing over and rivet gusset to rib



inboard hinge

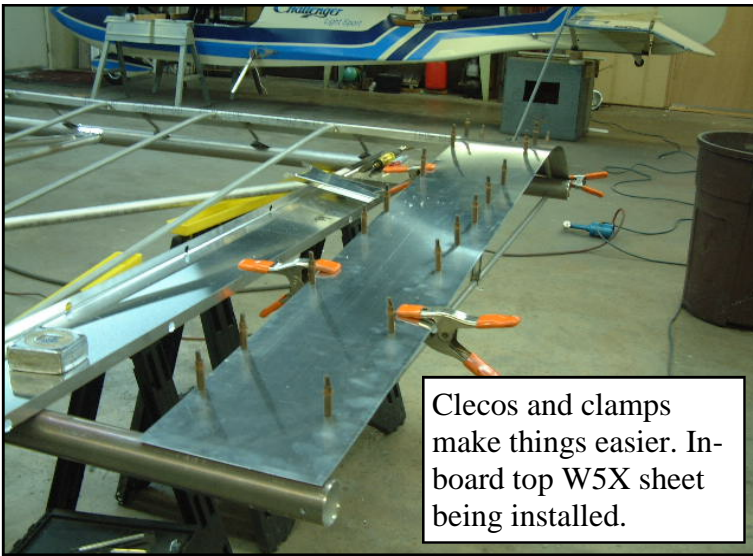
outboard hinges

Proper rivet hole location for aileron hinges



Clamp aileron hinges in place. Adjust hinge position to get max up and down travel.

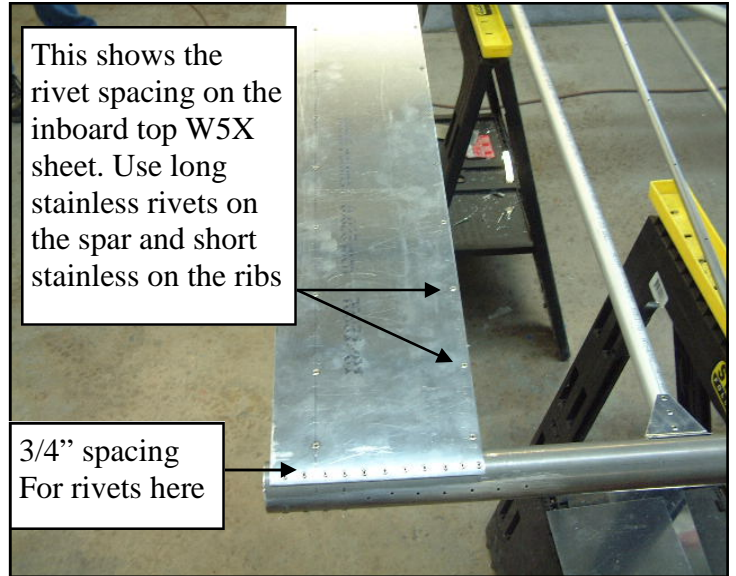
Drill 1/8" holes and number hinge location. Set hinges aside until later.



Clecos and clamps make things easier. In-board top W5X sheet being installed.



Pre-drilling W5X sheets makes life easier. Four inch rivet spacing works well.

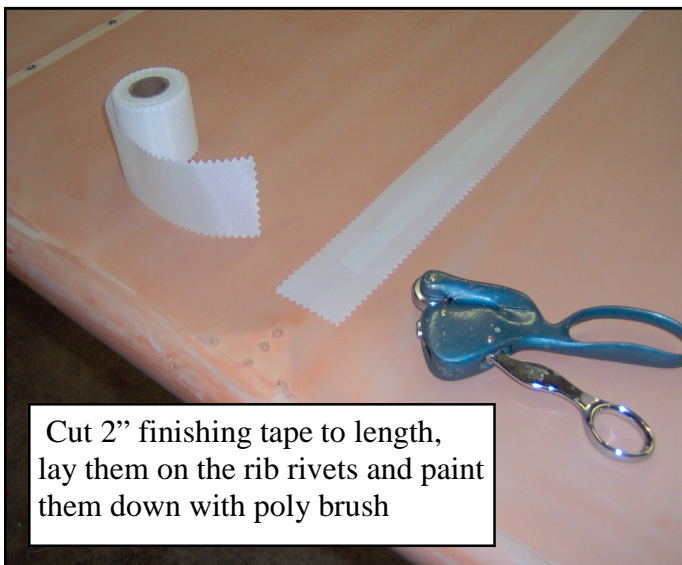
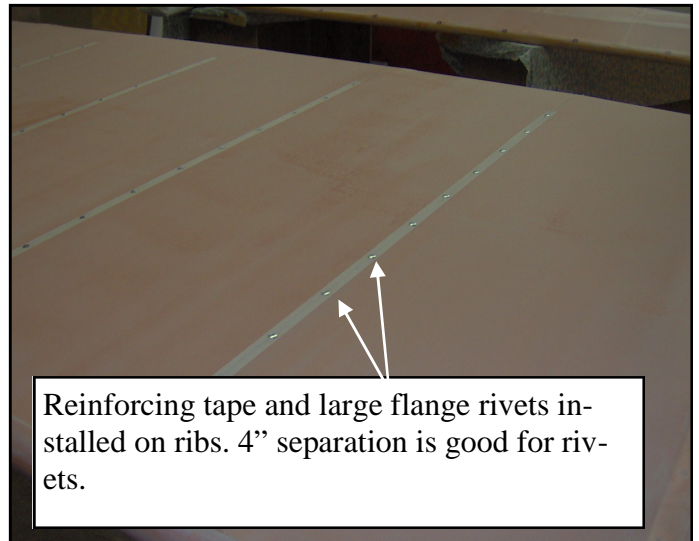
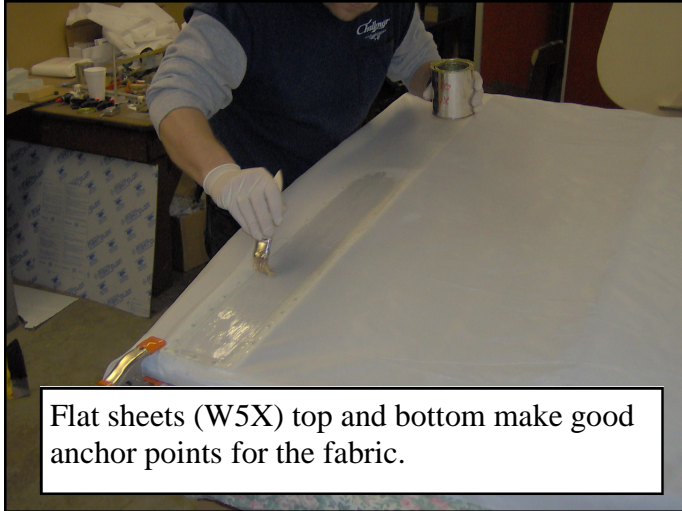


This shows the rivet spacing on the inboard top W5X sheet. Use long stainless rivets on the spar and short stainless on the ribs

3/4" spacing For rivets here

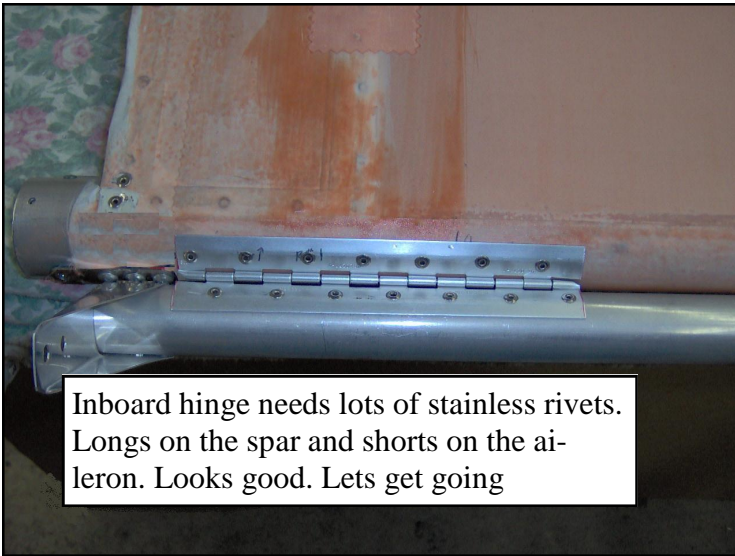
Before starting the covering process on the next page, make sure you have completed the wing tank installation, fuel line routing from tanks through the inboard (root) webbing as shown in the fuel tank installation pdf and picture files.

Basic covering sequence shown in these photos is rather simplified. More detail is in other pictures in the LSS manual and picture folders on the CD.

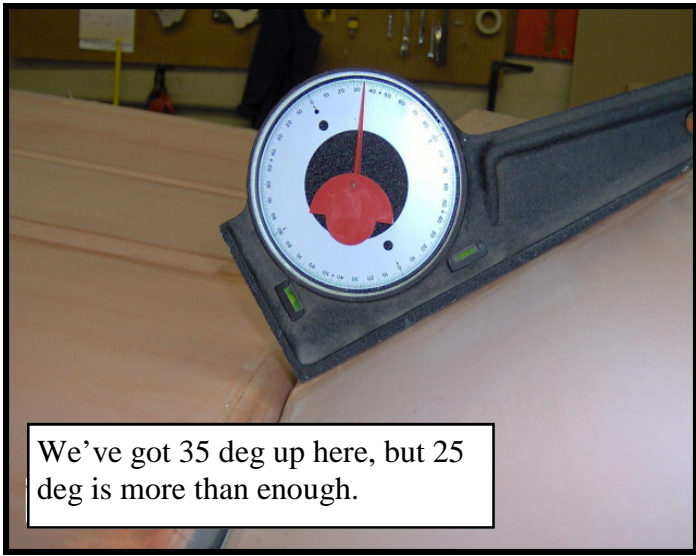


When you have covered the wings and ailerons and have applied fabric sealant (Poly-Brush), locate the previously drilled hinge locations and install the aileron hinges.

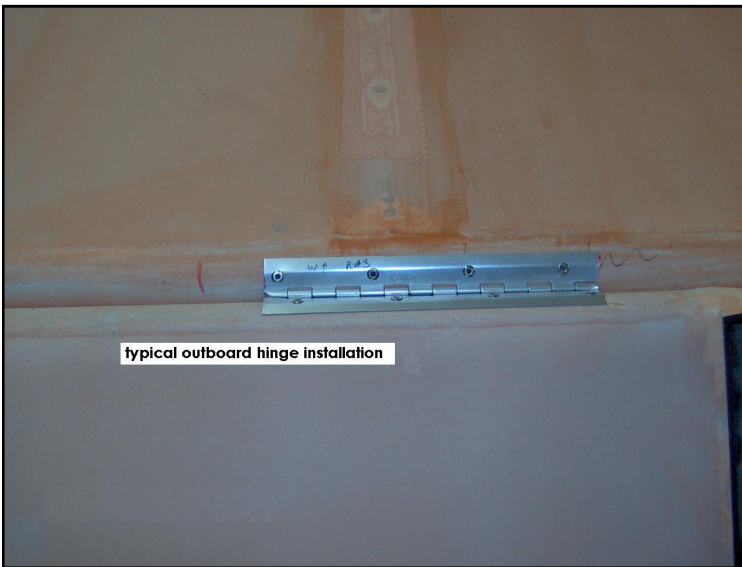
Important : Make sure you have the correct hinge for each attachment point. It will be highly unlikely that a different hinge will fit the holes you have previously drilled



Inboard hinge needs lots of stainless rivets. Longs on the spar and shorts on the aileron. Looks good. Lets get going

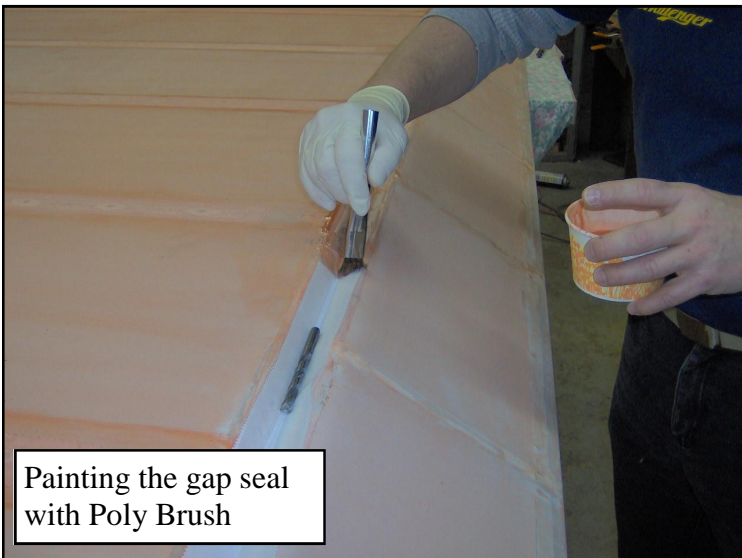


We've got 35 deg up here, but 25 deg is more than enough.



typical outboard hinge installation

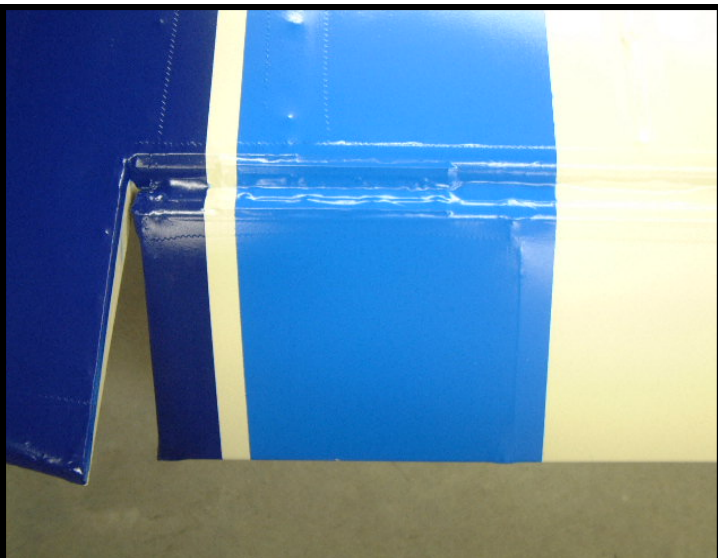
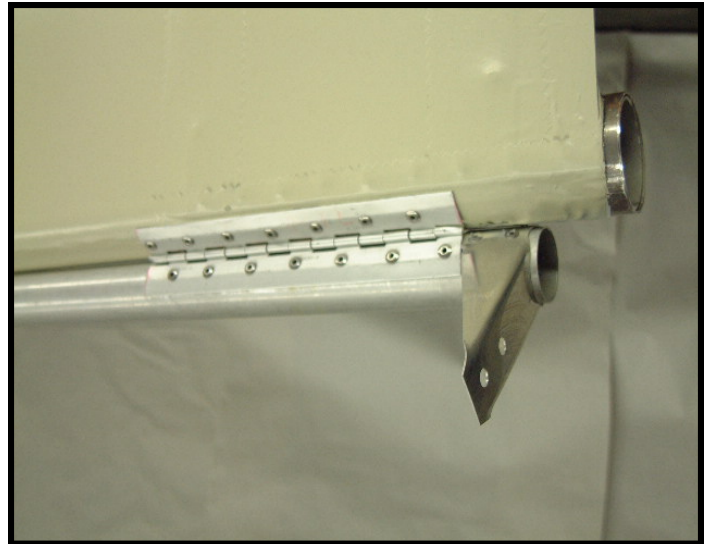
Typical outboard hinge installation. Note: Holes are drilled at every OTHER hinge barrel. 4 each side for outboard hinges. Inboard hinges are drilled at every hinge barrel point (7 each side).



Painting the gap seal with Poly Brush

This is the way to create a gap seal. Lay 2" finishing tape in the space between aileron and wing. Aileron must be in the down position. Lay some drill bits in the groove to keep the tape in place and simply apply Poly-Brush.

Pictures of painted wing



We used the standard Poly Tone system. It provides a light weight paint job but don't put too much on the aileron hinge gap seal or you may get some cracking of the paint. In this area we like one coat of Poly Brush (brushed on), then one coat Poly Spray and then two color coats. In the open areas of the wing you can put on two coats of Poly Brush, 2 coats of Poly Spray and two coats of color Poly Tone.

