

Pre-Paint>Wings>Fit ailerons

Objectives of this task:

In this task the ailerons and the pre-mould strips will be sized and trimmed, the pre-mould strips will be cut to match the ailerons and then flocked onto the wings and glassed in place, and the next day the ailerons will be fitted to the wings.

Materials required:

Epoxy resin and flock

Length of flat timber 150m x 1250mm, with one side covered in brown packing tape

Pavers or half bricks for weights to hold the pre-mould strip in place while the flock cures

Size the ailerons and pre-mould strips

For this step you will need to work on both wings together.

Mount the flaps temporarily with just the bolts and spacers, holding them in the fully retracted position with strips of tape over the top of the flap onto the wings.

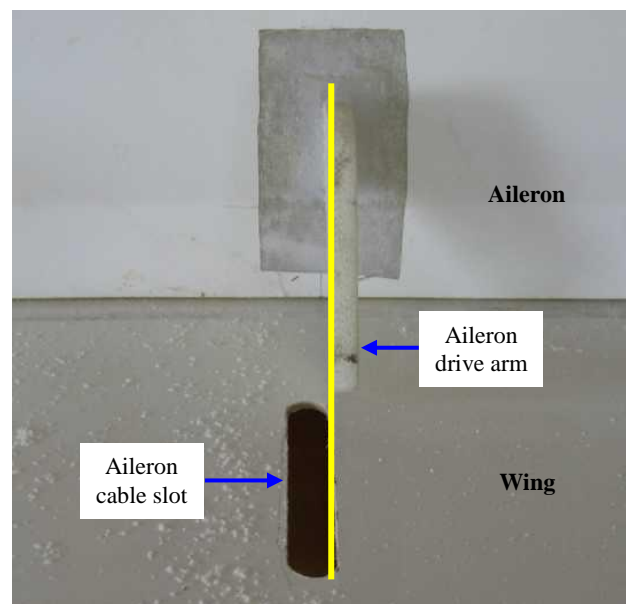
Check the distance from the inside of the wing tip to the outboard end of the flap: the distance should be very close to equal for both wings, and in the range of 1215mm to 1220mm. If the distance is not equal for each wing then it may be necessary to trim the end of the flaps slightly, but check the aileron lengths first.

With each wing right side up, lay the aileron in place on the wing and use a ruler or straightedge to line the aileron drive arm up with the aileron cable slot that was cut previously in the [Pre-Paint>Wings>Cut aileron cable inspection opening](#) task. The drive arm should very slightly (~1-2mm max) overlap the slot.

With the aileron held in this position mark the outboard end of the aileron where it touches the wing tip/winglet and mark the inboard end where it touches the flap.

Repeat the process with the other aileron on the other wing. Both ailerons should now be marked to an equal length in the range of 1215mm to 1220mm, ideally 1218mm overall, with the aileron drive arms both located either outboard or inboard of the slot.

At this point if the aileron or flap needs to be trimmed then you can make adjustments as required to equalise the length, mark carefully and trim with a hacksaw or jigsaw and sand to a smooth finish. Take care to make accurate cuts that exactly match the adjoining surface.





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At this stage each aileron should fit snugly into the gap between the wing tip and the flap with very little or no clearance at each end: when the ailerons have been finally fitted into place then the finished clearance (1mm or 1 mixing stick) can be adjusted with a sanding block.

Now cut the ends of the pre-mould strip so that it fits snugly between the wing tip and the flap. You may need to trim the lower outboard end of the curved "T" rib slightly.

Prepare the aileron and cut the pre-mould strip

Use a straightedge to check that the front of the Frise section is straight: use a long sanding block to correct any unevenness as shown at right.

Check and trim the hinge mount areas and make sure that all edges are straight and all corners are square.

Turn the wing upside down and wedge the back of the wing so that it is level and stable.

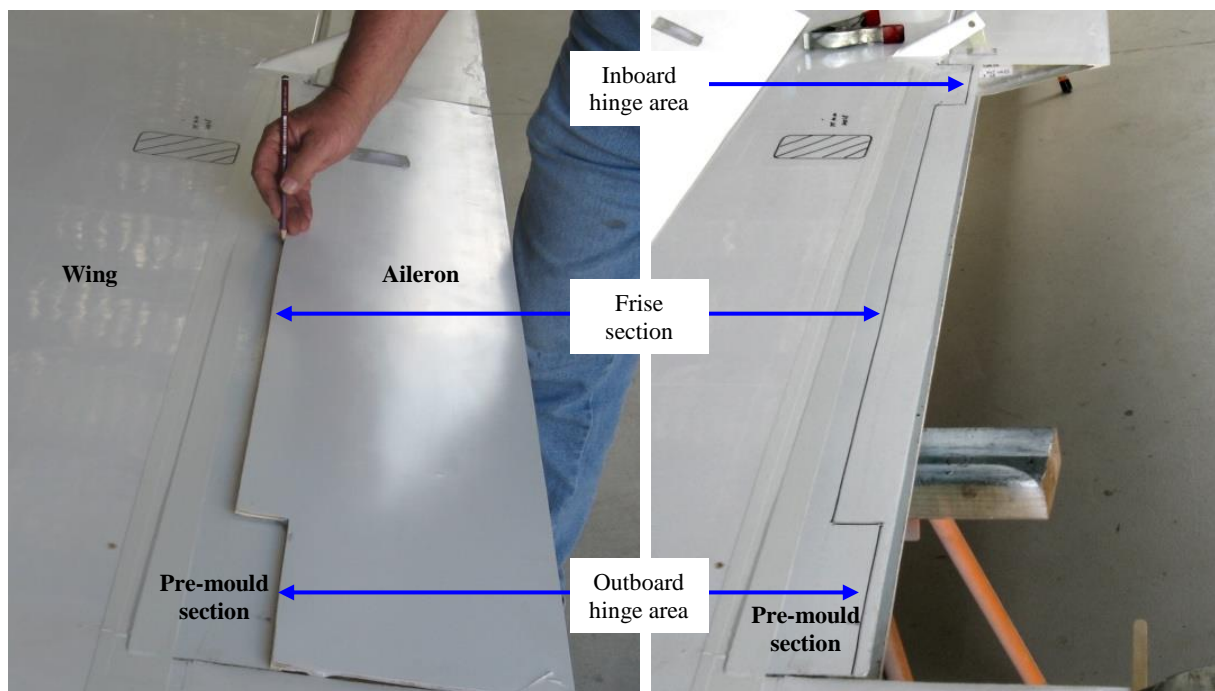
The “T” shaped pre-mould strip can now be taped in place so that you can test-fit the aileron and mark the pre-mould strip.



Tape the pre-mould strip to the wing: push it firmly forward so that the rib (the leg of the “T”) sits snugly against the back of the wing and hold it in place with a strip of cloth tape along the front edge (the top of the “T”). Check that the back edge is level with the top of the flap.

Mark each pre-mould strip either “left” or “right” to match the left or right wing.

Place the aileron onto the pre-mould strip with the Frise part of the aileron sitting on the top of the pre-mould strip as shown in the photo at left below. Check that the back of the aileron is precisely in line with the back of the flap and the back of the wingtip/winglet and check that the chord is 990mm



then tape the back edge of the aileron in place using cloth tape.

Use a pencil to mark around the front of the aileron: this marking must be precise – you want to have a small gap (the thickness of 1 mixing stick) between the front of the Frise part of the aileron and the



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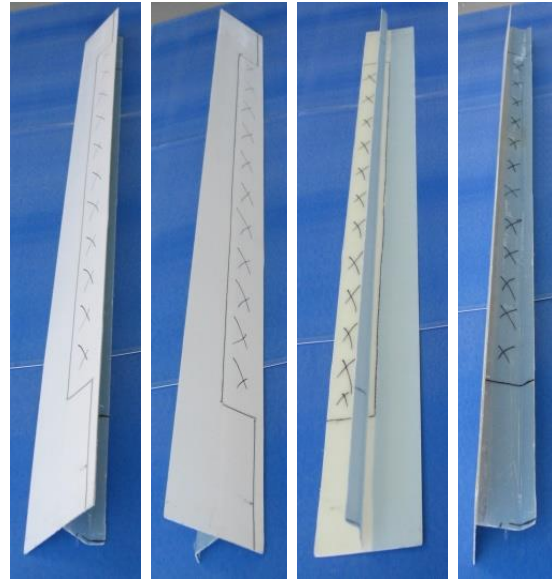
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pre-mould strip and a larger gap at the hinge mounting points to allow the knuckle of the hinge to sit between the pre-mould strip and the aileron and to allow the hinge pin to be fitted. In the photo at right above the mark has been made heavier for the sake of the photo only – use a sharp black pencil for your own marking.

Remove the pre-mould strip and extend the marking down the rib as shown at right then use a jigsaw to cut out the marked section. Sand the cut edges and check them with a straightedge.

The photos at right show a pre-mould strip marked prior to cutting, where the "X" marks emphasise the area to be removed.

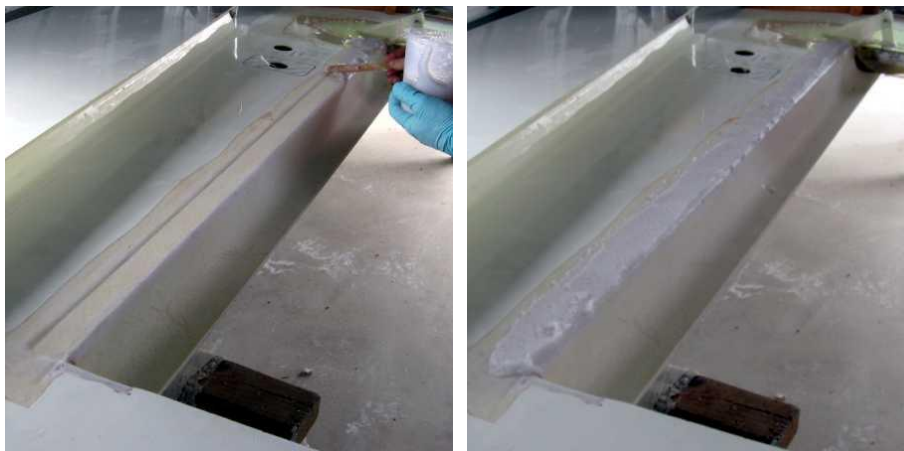
Notice that the rib will be completely removed from the middle of the pre-mould strip: the pre-mould strip, when cut, will consist of a complete "T" section at each end, joined by a thin strip and it will be quite fragile until it is flocked to the wing, so take care not to damage or break it.



Fit the pre-mould strip

Remove the peel cloth from the pre-mould strip (front top of the "T" and both sides of the curved rib, the leg of the "T") and sand lightly. Remove the peel cloth from the wing recess in front of the aileron and sand carefully. Remove all dust from the area.

Protect the outboard end of the flap from any excess resin or flock by covering it in brown packing



tape. For each wing, mix a 180g batch of resin and divide into a 160g batch and a 20g batch. Add flock to the 160g batch of resin and mix it in thoroughly.

Using the batch of resin, coat the recess on the top of the wing then apply a layer of flock to the recess – the layer should be around 3 to 5mm above the level of the wing.

Using the batch of resin, coat the curved part of the wing and the front of the curved rib on the pre-mould strip at each end in the hinge mount area, then apply a 10mm layer of flock to the bottom of the 2 curved ribs, the leg of the "T".

Fit the pre-mould strip into place – position carefully above the final location and then press gently forwards and down into place. Wipe away any excess flock with a mixing stick.



Place the packing tape-covered board on top of the pre-mould strip and weight it with several paving blocks or half-bricks to hold the pre-mould strip flat and flush with the wing. Flock will not stick to the brown packing tape.

Wipe away any excess flock along the bottom of the curved "T" rib, then apply a coat of resin to each side of the back of the curved "T" rib/wing joint and lay in a single length of AF303 glass fibre cloth (from the "Wing" bag) that overlaps each side of the curved "T" rib by at least 30mm. The lower edge should be slightly in from the trailing edge of the wing. Brush the layer in carefully taking care to avoid any bubbles or gaps.

Brush 3 layers of AF303 glass fibre cloth around the gap at the wing tip end of the pre-mould strip as circled in the photo at right.

Leave the wing/pre-mould assembly to cure for 24 hours before continuing with this task.

The pre-mould strip now forms an integral part of the wing and it will not be referred to separately again.

Check and cut the aileron recess

Next day turn the wing right side up.

Hold the aileron in place and align the rear edge of the aileron slightly (~5mm) behind the rear edge of the flap and the rear edge of the wing tip/winglet, with the upper front part of the aileron sitting on top of the wing and tape or clip it into place.

Check that the pre-marked aileron recess on the top of the wing is parallel with the front upper edge of the aileron.

Make any required minor corrections to the markings.

Put the aileron to one side and cut out the aileron recess on the top of





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the wing with a jigsaw, then sand to a smooth finish using a long sanding block.

Parts List			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	2A076B0D-2	SER XII WING TOP SKIN L.S.	1
2	2A076C0D-2	SER XII WING LOWER SKIN L.S.	1
3	2A080A0D-2	J170 FRISE AILERON ASSY L.S. - STEPPED LEADING EDGE TYPE	1
4	2A080E0D-1	J170 FRISE AILERON HINGE MOUNT FLAT SECTION	1
5	2A080F0D-1	J170 FRISE AILERON HINGE MOUNT BRACE SECTION	2
6	2001394-3	HINGE LEAF ALUMINIUM	4
7	2001694-3	HINGE PIN 3/32 ALUMINIUM HINGE	2
8	2001594-2	RETAINER - HINGE PIN	2
9	PH0059N	3/16" C'SUNK POP RIVET	16
10	MS21069-L08	ANCHOUR NUT	2
11	MS35206-245	SCREW 8-32 X 1/2 LONG	2
12	PH0399N	3/32" C'SUNK POP RIVET	4
13	2A080G0D-1	J170 FRISE AILERON HINGE REO/GUSSET - FITS INSIDE WING	4

A

B

DETAIL VIEW A

BOND GUSSETS TO HINGE MOUNTS USING FLOCK. APPLY R6 FILLET TO EDGES.

BOND PART TO WING USING FLOCK. MIN 90% COVERAGE. APPLY 1 LAYER AF303 OVER JOINT MIN OVERLAP ONTO EACH PART 30mm

BOND HINGE MOUNT SECTIONS TOGETHER USING FLOCK. MIN 90% COVERAGE.

FILL ENDS OF HINGE MOUNT WITH WHITE FOAM & COVER WITH 1 LAYER AF303 GLASS

BOND PART TO WING USING FLOCK. MIN 90% COVERAGE

TRIM ALL PARTS AS REQUIRED FOR FIT.

THIS DRAWING IS COPYRIGHT AND MUST NOT BE COPIED WITHOUT THE CONSENT OF AVTECH PTY LTD	SCALE	1	4/4/08
	NTS	ISS.	DATE
TITLE		DWG. No.	
J170 FRISE AILERON ASSY L.S. INSTALLATION		2A080D0D-1	
		SHEET 1 OF 1	

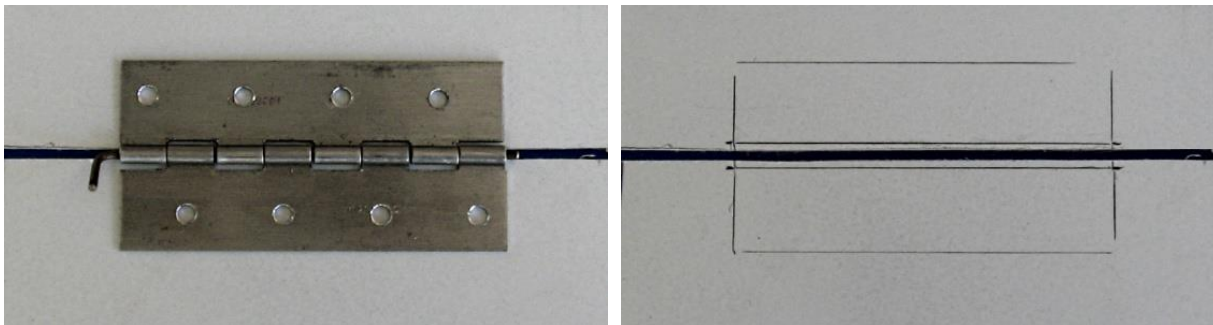
PROJECTION	DIMENSIONS IN MILLIMETRES	DO NOT SCALE	AVTECH P/L
GENERAL TOLERANCES WHOLE NO'S ± 0.5 ONE DEC. ± 0.25 TOW DEC. ± 0.05 ANGLES ± 0.5°	DRAWN DS		A.C.N. 010 786 973
MATERIAL REFER TO PART DRAWINGS	APPR.		HINKLER AIRPORT BUNDBERG 4670

Fit the aileron

Turn the wing upside down and wedge the back of the wing so that it is level and stable.

Fit the aileron into place – align the back of the aileron with the back of the flap and back of the wing tip and hold the aileron in place with spring clips or tape – and check the clearances: there should be no more than the thickness of 1 mixing stick between the front of the Frise section of the aileron and the back of the wing, but a stepped gap will be required for the hinges that is wide enough to fit the knuckle of the hinge between the aileron and the wing.

Note that the manner of hinge fitting here is opposite to the elevator hinge fitting in that the hinge knuckle protrudes rather than being recessed.

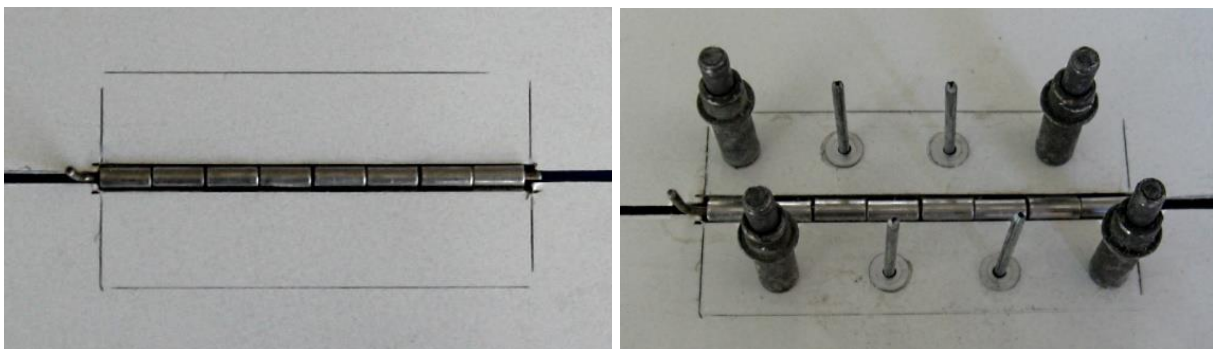


Centre the aileron hinges laterally in the hinge area with the flat side of each hinge facing downwards and the hinge knuckle sitting directly above the gap between the aileron and the wing as shown above left, then mark and cut around each hinge knuckle as shown above right while the finished cut is shown below left.

Drill 3/16" holes to mount each side of the hinge, and then test fit each hinge with 4 Clecoes and fit the hinge pin into place. Each hinge pin is inserted from the outside towards the centre of the aileron. In the finished photos on the next page you will notice that the aileron to wing gap is slightly wider on the outboard of each hinge to allow for the hinge pin.

Mark the location of the end of each hinge pin. Check that the Frise-to-wing gap is even along the full length then remove the aileron and hinges.

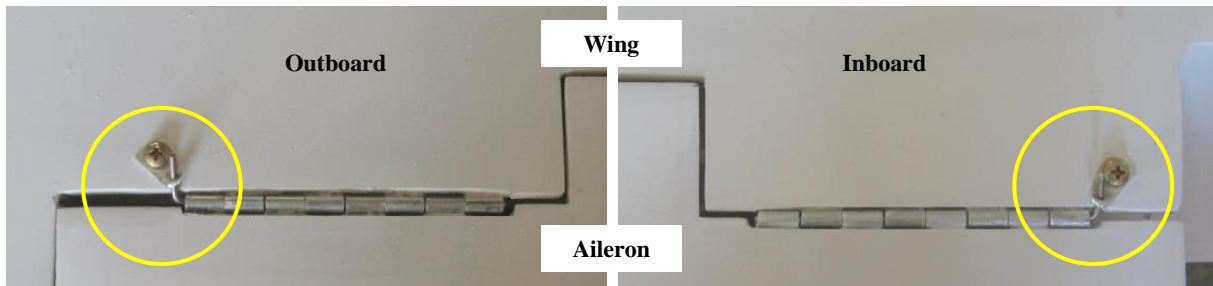
Sand the flat side of each hinge and the locations where they will be fitted, then mix a small batch of resin and coat each area. Add flock to the remaining resin and apply a 2mm layer of flock to each



hinge and flock into place using clean Clecoes in the outer holes as before.

Using a 120° countersink bit carefully countersink the 4 inner holes just enough so that a countersunk rivet head will sit flush with the surface when fitted and rivet the 4 inner holes with countersunk rivets. Now remove the Clecoes from the outside holes one at a time, countersink each hole and fit a countersunk rivet until each hinge has 8 countersunk rivets.

Take care to keep flock away from the hinge pins during this step: clean the hinges while the flock is still wet then leave both parts (wing and aileron) separate and leave overnight to cure, then store the ailerons for later painting. Clean the Clecoes in acetone after use.



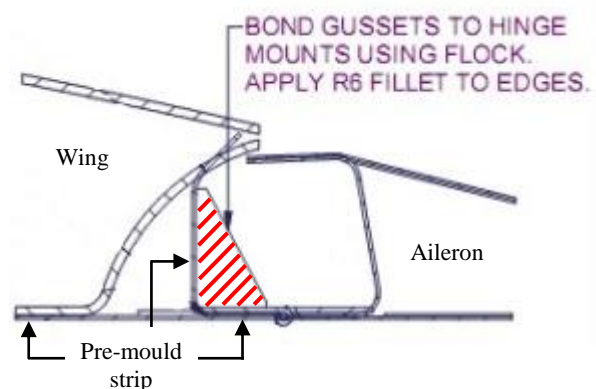
Next day use a rat tail file to make a slot into the wing at each hinge pin mark (example circled above), fit the hinge pin and the hinge pin retainer, mark the retainer screw hole and drill a 5/32" screw hole. Pop rivet a captive nut under each retaining screw hole using 2 x 3/32" countersunk rivets.

Fit the hinge gussets

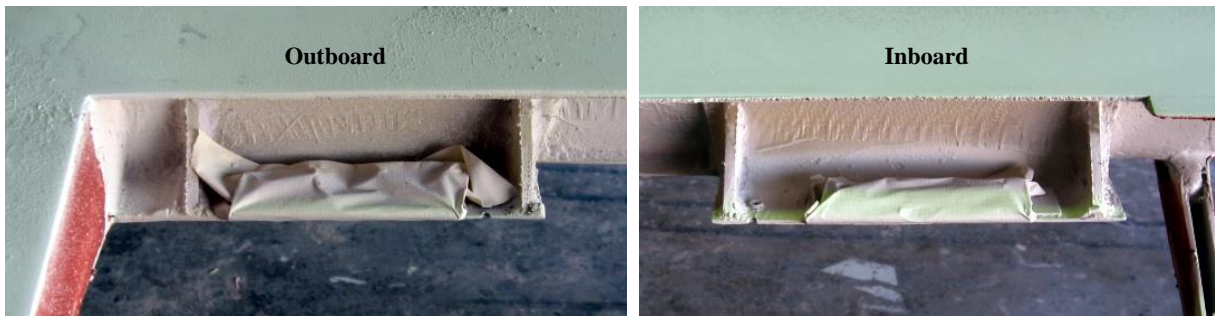
Turn the wing right side up for this final step.

The hinge gussets provide strength and prevent flexing of the pre-mould strip around the aileron hinges. Each hinge will have a gusset flocked in place at each side.

Cut 4 gussets per wing (for a total of 8 gussets) and fit each gusset to the pre-mould strip as shown in the drawing at right:



Each gusset will need to be sanded to a good fit, then flock one gusset in place at each side of each hinge: position each gusset carefully into place on a bed of flock, then use a clean mixing stick dipped in resin to round the flock off to a smooth R6 fillet. An R6 fillet is about a "finger wipe" radius. Do not wipe away any more flock or the load will not be transferred correctly and the gusset may break away in use. Leave the gussets overnight to cure.



The 2 photos above show completed outboard and inboard gussets on a wing that is prepared for painting – notice that the hinges have both been masked.

Next day fill any unevenness in the ends of the pre-mould strip with white foam or flock and brush 1 layer of AF303 glass fibre cloth over. Leave overnight to cure.

This completes the *Pre-Paint>Wings>Fit ailerons* task.



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