

Pre-Paint>Fuselage>Engine>Fit ram air cooling ducts

Objectives of this task:

In this task the ram air cooling ducts will be assembled and fitted to the engine.

The final step, where the front of the ducts are trimmed to length to match the bottom cowling, cannot be performed until the bottom cowling has been fitted to the fuselage and so that step is included as part of the *Fit cowling* task that follows this task.

Air enters the front of the ducts and is routed up by low air dams, through the fins on the cylinder heads and barrels and then downwards at the rear by a pre-fitted angled baffle.

An aluminium tube directs cooling air from each duct to the nearest magneto coil.

Materials required:

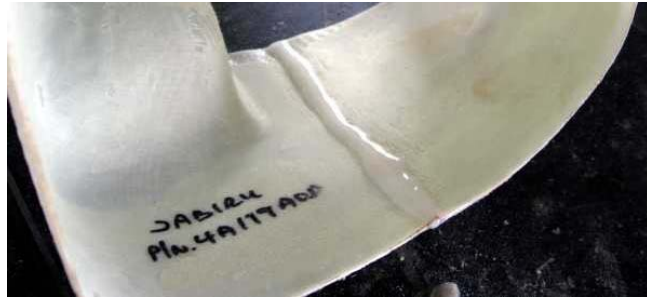
Epoxy resin and AF303 glass fibre cloth (from the bag labelled “*Extra Cloth*”)

5-minute Araldite and flock

Assemble the ducts

Use a length of masking tape on the join line at the bottom of each duct inlet to hold the join firm and prevent Araldite/flock from leaking through.

Mix a small batch of 5-minute Araldite and flock and apply to the top of each join as shown at right:



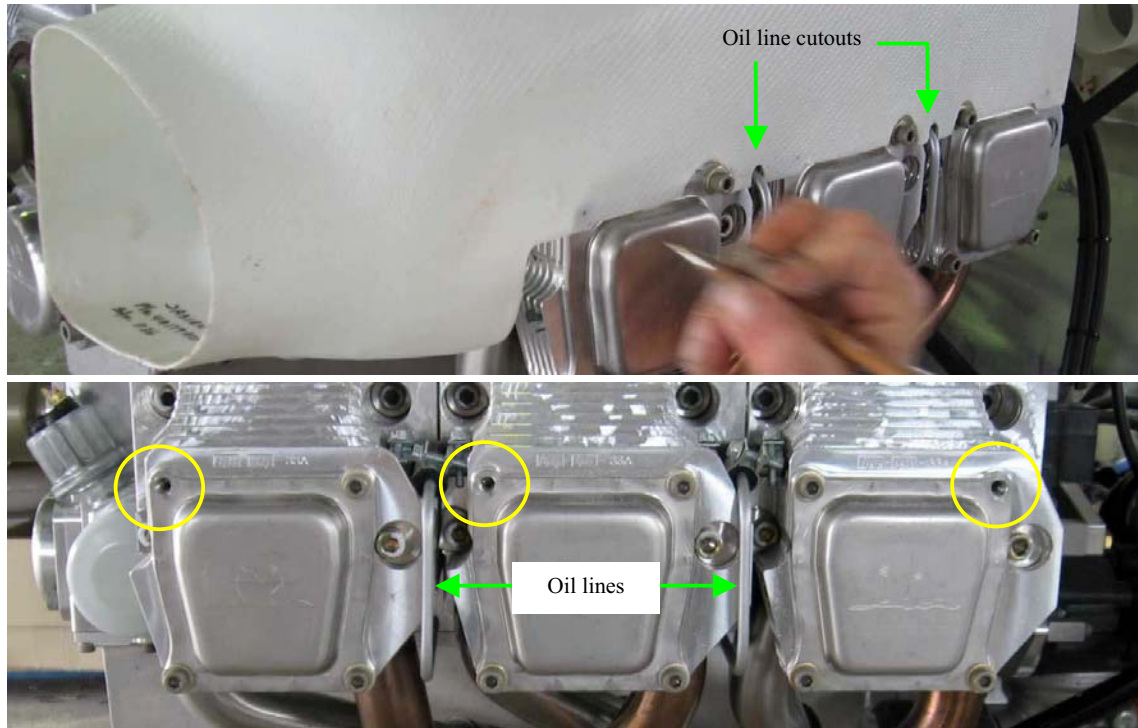
Next the front air dams will need to be cut to size. Take the length of glass fibre sheet with the curved edge, hold it against the rear of the duct inlet with the curve towards the top rear of the duct and mark around the bottom of the duct then cut to shape as shown above.

Tape the air dam into place. Mix a small batch of 5-minute Araldite and flock and use it to fix the air dam into place. Leave to cure, then sand away any rough edges.

Remove the masking tape and roughen the underside of the duct and the back of the air dam.

Mix a small batch of resin and brush 2 layers of AF303 glass fibre cloth to the underside of each duct, covering the join line and wrapping up around the back edge of the air dam.

Leave overnight to cure.



Test fit the ducts

Fitting the ducts will require adjustments to be made in several areas: firstly the oil lines to the rockers will need to be accommodated, then the rear baffle and the air dams will need to be adjusted and then the sequence repeated perhaps 2 or 3 times until the fit is correct.

Remove the 2 front and 1 rear rocker cover cap screws (circled top), test fit the duct and mark the locations for the cutouts around the oil lines (arrowed above). File out a notch for each oil line until the duct clears them by 1-2mm all round.

Leave the cap screws out and set aside until the final fitting of the ducts is complete.



The front air dams will need to be trimmed to fit around the fins on the cylinder heads and barrels. The final fit must have the air dams only just touching the fins as shown above.

It may take few trial fits so take your time and get the fit just right.



Left-hand duct, shown here upside down. The pencil marking is on the rear baffle

The baffles at the rear of each duct will need to be trimmed to allow the duct to sit down correctly. Test fit and trim until the inside of the duct sits down on the barrels, between the fins as shown above right, and the outside sits just on the top of the rocker covers.

Once the rear baffle and air dams are fitting correctly you can mark and drill each of the 3 rocker cover holes (circled in the photo at the top of the previous page) to $\frac{1}{4}$ " and temporarily mount both ducts using the cap screws.

Mark a point on the inside of the duct directly above each front cylinder and drill a $\frac{3}{32}$ " hole, then flock and rivet the supplied right angle spring bracket into place as shown at right, placing a washer on the rivet inside the duct.

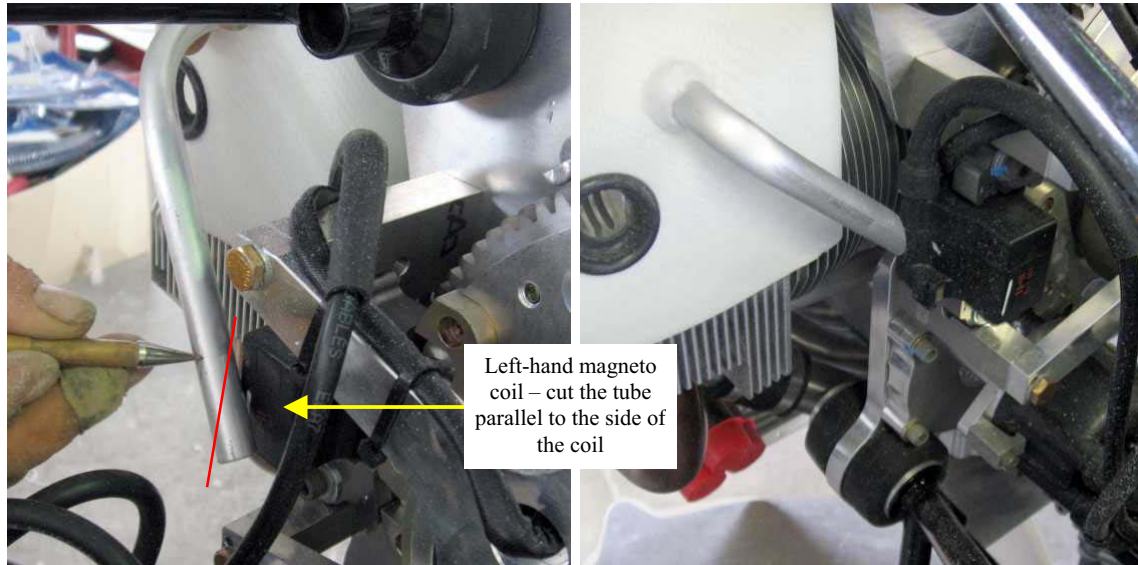
Fit a loop of lock wire around the cylinder between the third and fourth fin and through the bottom of the spring and twist it off.

The spring may be unhooked at the bracket end to remove the duct.



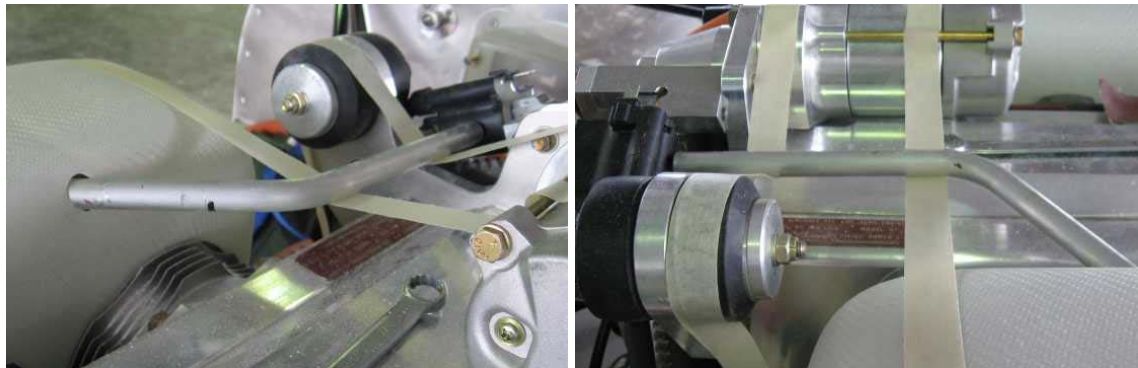
Fitted left-hand side duct.

Fit the magneto coil cooling tubes



Starting with the left-hand duct, drill a ½” hole at the top centre rear of the duct and slip the 90° curved aluminium tube into place. Aim the lower end of the tube at the centre of the left-hand magneto coil, mark the tube at an angle parallel to the side of the coil, remove the tube and cut along the mark. Shorten the top end of the tube as required – it should fit about 1½” to 2” (40-50mm) inside the duct.

Refit the tube to the duct and hold it in position with masking tape. Mix a small batch of 5-minute Araldite and flock and fix the tube to the duct. Leave to cure, then remove the duct and apply flock around the tube on the inside of the duct to provide strength. Leave to cure.



The right-hand duct will require a ½” hole on the inside top curve as shown above left, then follow the same procedure of holding the 45° tube in place with tape and flocking into place.

Leave to cure, then remove the duct and apply flock around the tube on the inside of the duct to provide strength. Leave to cure.

Refit both ducts and leave them in place.

This completes the *Pre-Paint>Fuselage>Engine>Fit ram air cooling ducts* task.