

## **Suggestions to Modify NSI Cooling System**

### **By Rupert Clarke**

I believe the NSI cooling system is more than adequate for 180 hp in hot conditions. Some history, I made quite a few mods to the plenum, but it was not until I removed the thermostat, following an error I made in refitting my new engine, that I realized how capable it was.

Because I was keen to recover my aircraft from the scrub on Flinders Island I decided not to connect the cabin heater until I had more time fabricate a second inlet to the thermostat housing. I reconnected the line from the heated throttle body but this did not flow enough hot coolant to open the thermostat before the coolant boiled. When I realized the problem and removed the thermostat the engine ran way too cool (150°) even in a full power climb. Ken Wickland has since removed his thermostat and also sees temperatures 20° less than before.

My modifications included:

- Stainless steel screens to reduce and smooth *over engine* airflow - **Photos #1, 2 & 3.**
- Rounded internal fairings in radiator ducts to smooth airflow - **Photos # 4 & 5**
- Reflective heat insulation under muffler (we had to replace the bottom of the cowl) **Photo #6**
- Additional cut out at rear of lower cowl (may not be necessary) **Photo #6**
- Rounded fairing at bottom of firewall - **Photos #7 & 8**
- Added SS tube T piece to flow both heater and throttle body coolant to thermostat housing **Photo #8**
- Radiator fans (may not be necessary) These fans are pretty heavy, 10 lbs, and are set to switch on at 200° so I am thinking of removing them. **Photo #9**
- Insulated the muffler and muffler inlet pipes **Photo #10**

I now see coolant temperatures around 175° most of the time with a rise to 200° in high power climbs.

Some thoughts:

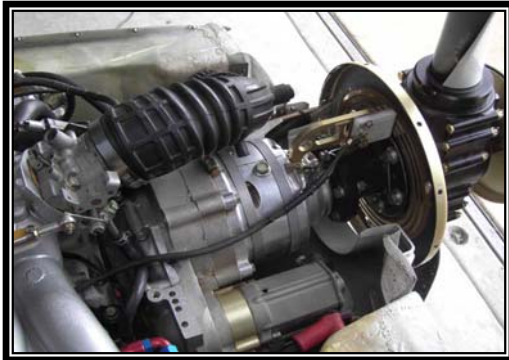
I suspect that cooling drag may be a reason that I do not seem to go as fast as an O-320 9A at an identical fuel flow (TAS 167 Kts at a DA of 8,500 flowing 9.7 gal/hr) but there are quite a few other possibilities including how my ailerons are rigged and the general paint finish of the a/c etc.



# 1 STAINLESS STEEL SCREEN FROM FRONT



#2 STAINLESS STEEL SCREEN LEFT SIDE



# 3 STAINLESS STEEL SCREENS FROM ABOVE



#4 COWL DUCT INTERIOR FAIRING



#5 DUCT FAIRING



# 6 BOTTOM DEFLECTOR AND CUTOUT



#7 BOTTOM FORWARD DEFLECTOR



#8 FORWARD DEFLECTOR AND HOSE "T"



#9 COOLING DUCT FANS



#10 MUFFLER WRAP