

SERVICE BULLETIN: JSB 013-1

Issue: 1

Date: 8th August 2006

Subject: Jabiru 2200 Engine Rocker Chamber Vent

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2 Applicability

Jabiru 2200 engines (all models) in the following Serial Number ranges:

2200A – S/No. 2068 – 2439

2200B – S/No. 2 – 28

3 Background

The upper valve train of Jabiru engines is lubricated by means of a low-pressure feed which supplies oil to the valve guides and rockers, then flows back into the sump via the pushrod tubes.

In the engines listed above the flow of oil back into the sump can be reduced by internal airflow and pressures inside the crankcase. This effect is magnified by a build up of negative pressure inside the rocker cavity (as air is drawn out of the rocker cavity by the normal leakage past the intake valve guide) and by the additional oil flow from the hydraulic lifters.

This restriction in the amount of oil flowing back into the sump leads to the rocker cavity filling with oil. As the rocker cavity is at a high temperature (typically over 130° Celsius) the oil is overheated, becoming very thin and gradually losing its lubricating properties. This leads to increased upper valve train wear (valve guides, rocker bushes etc) and elevated oil consumption as the thin oil is sucked down the intake valve guides and burnt in the engine. In some cases oil may also be found in the induction manifold.

This phenomenon varies from engine to engine due to differences in operating regimes, different average oil levels in the sump, different engine vent outlet pipe positions and different levels of blow-by past the piston rings. Jabiru 3300 and 5100 engines (including 3300 engines with hydraulic lifters) do not suffer from this problem due to the larger airspace volumes in their crankcases and oil sumps.

Drilling a small vent hole inside the rocker cavity removes the negative pressure inside the rocker cavity and allows the oil to drain normally into the sump (Note that as the pressure inside the cavities is generally less than ambient, air is sucked in through the vents – only negligible amounts of oil flow out). The following Service Bulletin details the installation of the rocker cavity vent and ways to manage oil consumption before and after the vent is added.

4 Recommendations:

4.1 Modification per Section 6:

Jabiru Aircraft recommend that all engines in the range noted be modified as detailed in Section 6 during their next scheduled 50-hourly maintenance.

Notes:

- it will take some time for the engine's oil use to stabilise due to the new oil level operating regime or the modification. Generally at least one hour of circuits will be required to stabilise consumption by de-glazing the cylinder bores and burning clean the combustion chamber, though it will vary from engine to engine.
- Some oil consumption is normal. The engine's Instruction & Maintenance Manual provides specifications for normal oil usage.

4.2 Operations Until Modified:

In the time between issue of this Service Bulletin and incorporation of the modification detailed below, follow these guidelines:

- a) Fill the oil sump no higher than the lower mark of the dipstick. Note that oil level is read by screwing the dipstick fully in – just inserting the dipstick without screwing it fully in will give an inaccurate oil reading and result in higher oil usage.
- b) Check the position of the crankcase vent outlet to ensure that the crankcase vent is being exposed to pressure equal or less than the air pressure inside the cowls. Venting into the cowl space (as with factory Jabiru installations where the oil overflow bottle is vented to cowl pressure) is acceptable, but installations where the vent line is exposed to ram-air pressure or other elevated pressures should be modified accordingly.
- c) Do not fill the sump above the lower mark before flying longer legs – the excess oil will quickly be burnt or blown out the vent. Oil consumption when filled below the lower mark should be monitored and known to be acceptable before carrying out flights of over 3.5 hours duration.

4.3 Operations After Modified:

- a) Continue to fill the oil sump no higher than the lower mark of the dipstick.
- b) Oil consumption when filled below the lower mark should be monitored and known to be acceptable before carrying out flights of over 3.5 hours duration.

5 Compliance:

- Jabiru Aircraft recommend changing oil level operating regimes immediately (Ref details above).
- Jabiru Aircraft recommend modifying the engine in accordance with Section 6 below during the engine's next scheduled 50-hourly maintenance.

6 Procedure – Vent Rocker Cavities

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- i) With reference to the engine's Instruction & Maintenance Manual, remove the aircraft cowls and engine ram-air ducts.
- ii) Remove the rocker covers from the engine.
- iii) Locate the position shown in Figure 2 below and use a small centre punch to mark the hole position.
- iv) Using a 3/32" drill bit, drill a hole in the head as shown. The hole must angle upwards to encourage oil to flow back into the rocker cavity instead of out into the engine bay. Before drilling, coat the tip of the drill bit with grease to catch the aluminium shavings from the hole. Drill in stages, cleaning and re-greasing the drill every second or two. Ensure that no loose shavings escape into the rocker cavity.
- v) Replace the rocker covers re-assemble the aircraft.

Vent hole located midway between valves at the top of the rocker cavity.

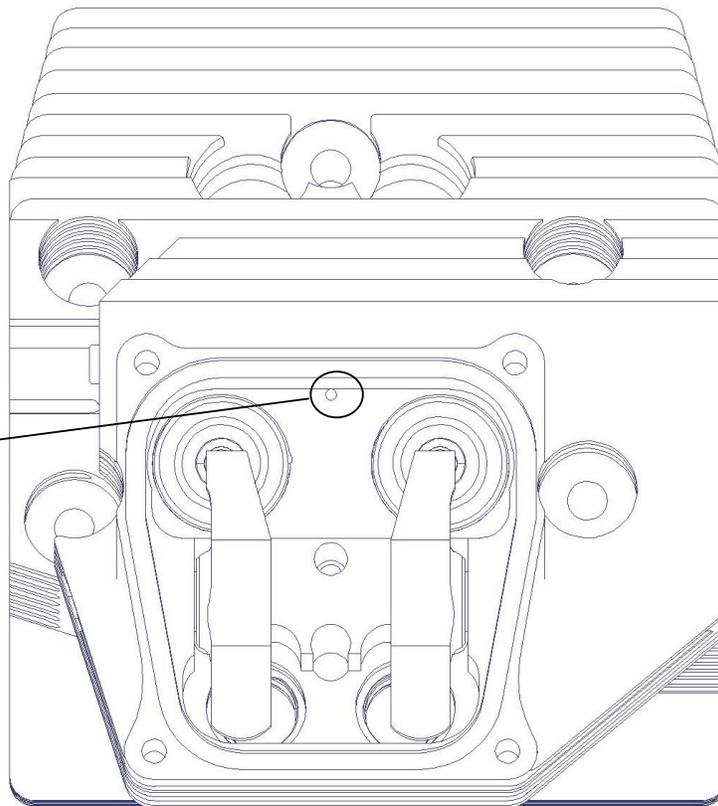


Figure 1. Vent Position – View Looking Parallel to Valves

Vent hole running upwards from rocker cavity into external finning. Note: hole may be angled further upwards if required.

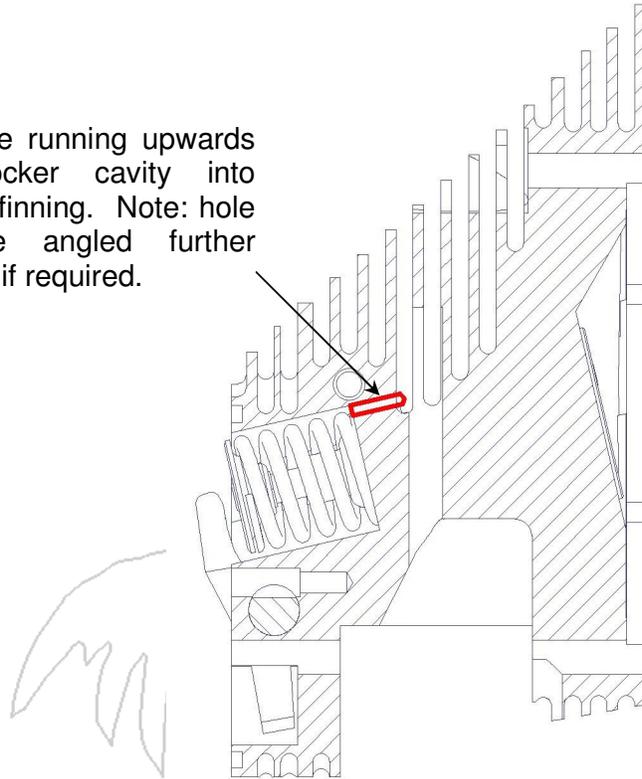


Figure 2. Sectioned View of Head Assembly – Hole Shown.

7 Airworthiness Note:

Where required, work called for by this Bulletin must be carried out by authorised personnel only. In Australia this generally means the original builder of an Experimental-category aircraft (either RAAus or VH registered), an RAAus Level 2 holder for other RAAus aircraft or a Licensed Aircraft Maintenance Engineer (LAME).

On completion of the work, the authorised person must note the completion of the actions required by this bulletin in the aircraft's maintenance logbook. As a minimum, this note should refer to the completion of maintenance requirements of this Service Bulletin, indicate the date of the work and the identity (including licence number where appropriate) of the person carrying out the work.