

Automatic Fuel Limiter (AFL) springs

Classification:

This Service Bulletin has been classified as mandatory by Kavanagh Balloons. The technical content of this Service Bulletin has been approved by CASA.

Applicability:

All Kavanagh Balloons stainless steel fuel cylinders fitted with Automatic Fill Limiters. Myton Rod or STPV manufactured 55L, 76L and 82L cylinders.

Requirement:

- 1) Identify if the AFL has had the float spring removed – The letters "NS" will be stamped on one flat of the AFL if this modification has been carried out already or at the time of manufacture.
- 2) If requirement item 1 shows that the float spring has not been removed or the AFL is not marked as having the spring removed then inspection and modification must be carried out as per this Service Bulletin.

Compliance:

Requirement 1 must be carried out not later than the next annual/periodic inspection of the aircraft.

Requirement 2 must be carried out at the owner/operators convenience but not later than the next scheduled 10-year inspection for the fuel cylinder.

An appropriately qualified maintenance authority holder must carry out this inspection and all work.

Background:

Automatic Fill limiters (AFL) have been fitted to Kavanagh supplied fuel cylinders since 1998. The AFL allows filling of the cylinders at service stations or depots without the bleeding of vapour from the cylinder. This offers increased safety during refuelling procedures.

The original design of the AFL included a spring in the float assembly to assist the operation of the float during re-fuelling (Figure 1).

Subsequent testing by the AFL manufacturer has shown that the spring is not necessary and that AFL's not fitted with the spring, perform as required. Since 2005 AFL's have not had the spring included however not all AFL's have had an external indication that the spring is not fitted..

During tank inspections it has been found that some AFL's that had the float spring installed have had the spring fail and separate from the AFL. The two or more sections of spring have been located in the bottom of the fuel cylinder.

Failure of the spring is suspected to be from fatigue, as the float mechanism will bounce during road transport of the cylinders. This bouncing of the float can be particularly excessive when the cylinder is transported less than full. Unfortunately as part of normal balloon operations this would effectively be after every flight until such time at the cylinder is re-fuelled.

In most cases the sections of spring will remain in the bottom of the cylinder and will pose no further risk and can be removed during the 10-year inspection of the cylinder.

There have however been isolated reports of the broken sections of spring being drawn into the main liquid dip tube and becoming lodged under the liquid valve seat. In such cases the liquid valve may sustain damage to the valve seat or the valve seal and may not shut off completely.



Identification and action if the spring has migrated to the valve:



NOTE: a leaking valve does not necessarily indicate that a broken AFL spring is the cause. Removal/replacement of the bonnet assembly in the valve will be required to confirm the actual defect with the valve. Due to the restrictions in the liquid valve couplings and the valve body there is no possibility for the spring to pass further into the fuel system.

A leaking liquid withdrawal valve can be identified by the following means.

- 1) Connect a burner hose to the fuel cylinder
- 2) Test the system has normal fuel pressure by operating the burner.
- 3) Close the liquid tap on the cylinder and vent the liquid line at the burner.
- 4) With the fuel hose still connected, monitor the pressure gauge on the burner for an increase in pressure. Any increase indicates a leaking cylinder valve.
- 5) If a leaking valve is identified, the cylinder must be removed from service and the leaking valve investigated/repared before further flight.

Recommended procedure if a leaking valve is discovered in-flight;

- 1) If possible, leave the burner fuel line connected to the affected cylinder as this ensures that there is no risk of leakage until the landing has been carried out.
- 2) Where a cylinder change in flight is required, use as much of the remaining fuel as possible in the affected cylinder first.
- 3) Close the cylinder valve and disconnect the burner fuel line, allowing the safety check valve in the connector to seal the cylinder. Check for leakage at the safety connector.
- 4) Land at the earliest opportunity.
- 5) The cylinder must be removed from service and the leaking valve investigated/repared before further flight.

AFL Inspection:

- 1) Inspect the AFL body for the stamp "NS" on one of the hexagon flats. "NS" indicates that there is No Spring fitted to the AFL and no further action is required if the AFL was serviceable at this time.
- 2) If the "NS" marking is not found on the AFL, then the AFL must be removed and modified as per this Service Bulletin.

AFL Modification:

- 1) Ensure the fuel cylinder is empty of LPG and has been purged prior to carrying out any work.
- 2) Remove the contents gauge from the cylinder.
- 3) Using a cold light source, perform an internal inspection of the cylinder for broken pieces of the AFL spring. If any parts of spring are located, vacuum out the sections of spring using a shop air vacuum.
- 4) Remove the Fixed Liquid Level Gauge (FLLG) from the Cylinder.
- 5) Using appropriate tooling (KP1703 or similar) remove the AFL from the cylinder.



NOTE: The float may come into contact with the liquid dip tube so slow rotation of the AFL is required to prevent damage to the AFL float mechanism.

- 6) Inspect the base of the AFL and float mechanism for the spring. If the spring is still installed remove and discard it at this time.
- 7) Stamp or engrave one flat of the AFL with the letters "NS" to indicate the spring has been removed.
- 8) Check the calibration of the AFL float mechanism and adjust if required. Refer to Figure 2 for the calibration check.
- 9) Apply shop air to the AFL through an appropriate connector and carry out a functional check of the AFL. The AFL should shut off when the float is raised. If the AFL fails to shut off it must be replaced, as there are no serviceable parts in the AFL.
- 10) Clean and inspect the threads on both the AFL and the tank boss and install the AFL with Loxseal (KP3687) sealant or Locktite 577 (KP3682). Ensure the float is lined up between the liquid dip tube and the contents gauge and has un-restricted movement.
- 11) Clean and inspect the threads on both the FLLG and the tank boss. Install the FLLG with Loxseal (KP3687) sealant or Locktite 577 (KP3682)
- 12) Using a cold light source, inspect the inside of the cylinder for debris and clean as required.
- 13) Install the contents gauge with a new gasket (KP3678) and screws (KP4064)
- 14) Pressurise to 2.3mpa and carry out a leak check of all valves and fittings.
- 15) Make a record on the component card for the cylinder to indicate that KAV-SB-002 has been carried out.

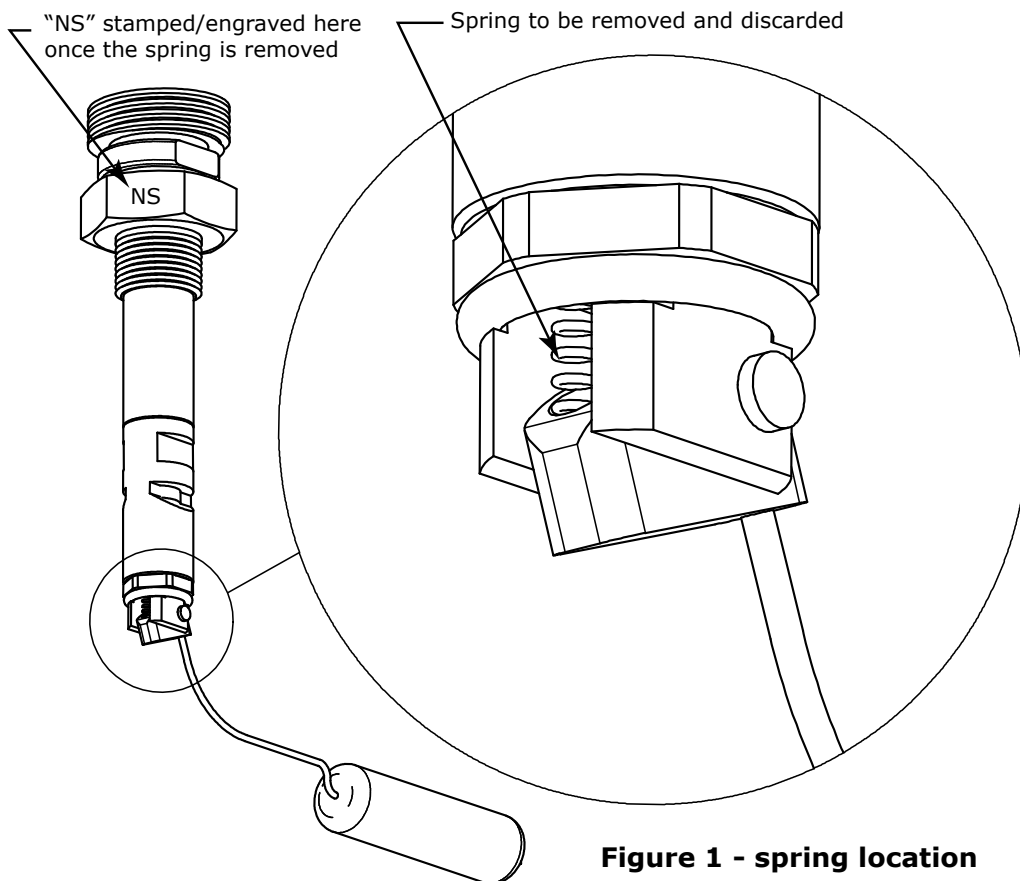


Figure 1 - spring location

AFL Calibration

This page should be printed out and the scale checked to ensure correct calibration of the AFL float.

The diagram shows the float position for Kavanagh 55L, 76L and 82L fuel cylinders.

When setting the float it is important that the center of gravity of the float matches the location shown on this drawing. The actual float angle may vary slightly but it is the C of G that is critical for accurate AFL operation.

Adjustment of the float position is carried out by carefully bending the float arm.



NOTE: it is important that pressure is not applied to the actual float pivot when bending the float arm. Damage to the float mechanism may occur.



NOTE: The 76L AFL (KP3616) and 82L AFL (KP3606) are interchangeable provided the float is correctly calibrated.

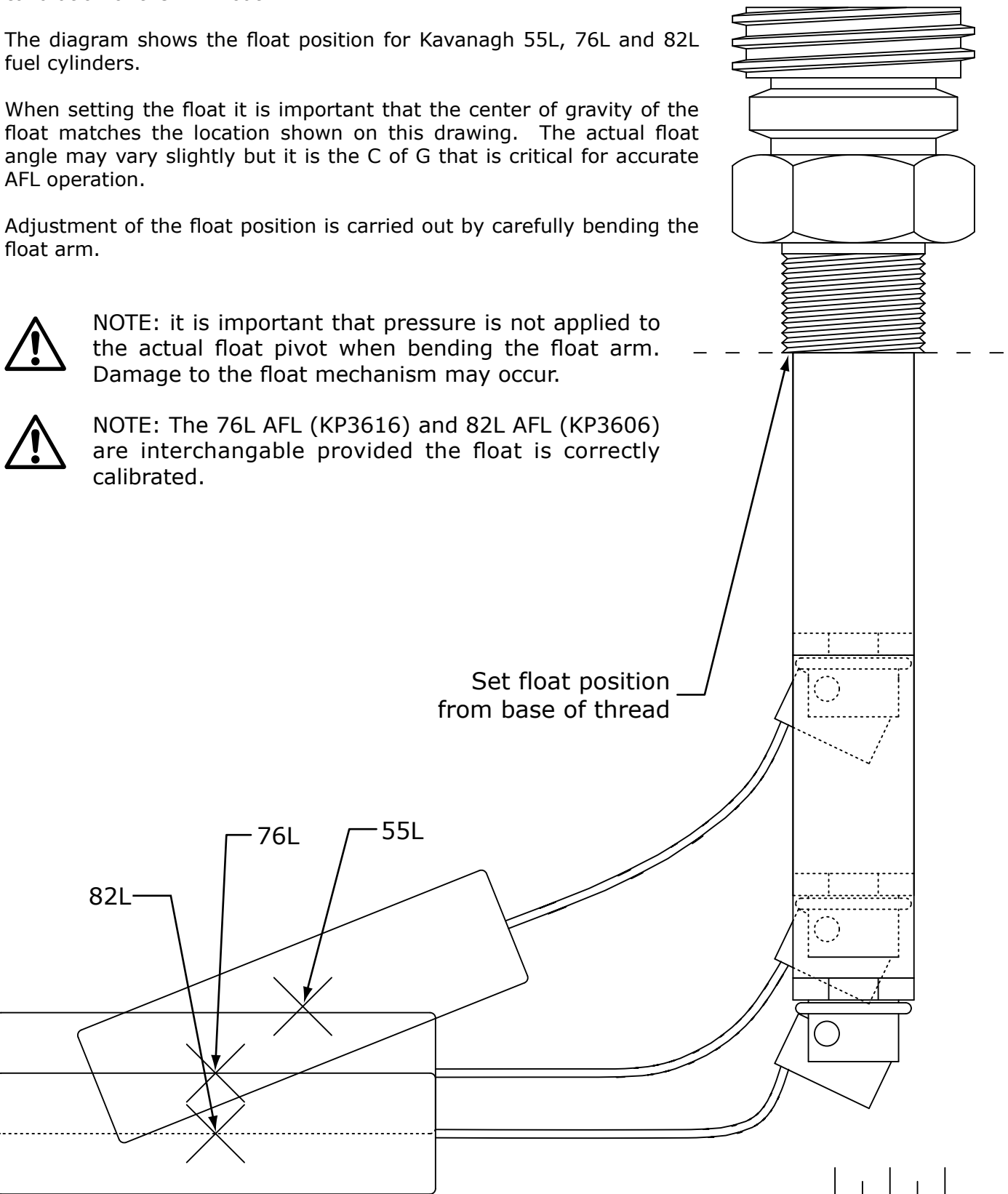


Figure 2 - AFL Calibration

0 10 20
Scale Check (mm)