



Remote Oil Filter

Service Bulletin Number: SB-006

Subject: Cautions regarding externally mounted oil filter installations. A number of reports over the past few years address remote oil filter adapter issues that led to ruptured or damaged filters. In each case, regardless of the oil filter's manufacturer, the filter was installed on a remote filter adapter or on an aftermarket oil filter adapter mounted on the engine.

Background: Many aircraft engine oil screens have been replaced with remote filter arrangements. While in a general sense changing from a screen to a filter can be a good thing, certain cautions need to be kept in mind when doing so.

Oil is supposed to enter the filter through the ring of small holes that surround the central hole in the filter base and supposed to leave the filter (go to the engine) through the central hole, see Figure 1. If the hoses are crossed, the filter element may be displaced and block oil from leaving the filter. Pressure in the filter will rise until the case bursts.

Some Lycoming spin on filter retrofits require an adapter plate and gaskets at the engine accessory case. If the plate or gaskets are installed incorrectly, the oil pressure in the filter will rise and the filter case may be ruptured, see Figure 2.

Some filters incorporate anti-drain-back valves (AA48108, AA48108-2 and AA48109) that allow oil to flow into the filter through the small holes but not out of the filter through those holes. If the oil lines are reversed, the valve closes and pressure in the filter rises. The filter case will burst or the rubber valve will be extruded through the holes in the filter's base plate and rubber particles will, most likely, be forced into the engine oil passages causing engine damage.

NOTE; Some filters are equipped with internal differential pressure relief (by-pass) valves (AA-48108, AA48108-2 and AA48109). Some filter adapters may have built in by-pass valves. Caution, even where such valves exist THEY WILL NOT PROTECT AGAINST filter case over pressurization. Such valves protect only against small differentials across the media in the filter itself, not against system overpressure.

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Oil Enters Filter Through
The Ring of Small Holes
(FLOW FROM ENGINE)



Oil Exits Filter Through
The Center Hole
(FLOW TO ENGINE)

FIGURE 1
INLET AND OUTLET HOLES



FIGURE 2
NORMAL FILTER CASE



FIGURE 3
BURST FILTER CASE FROM
OVERPRESSURE

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Figure 2, shows a normal filter case. Compare the curvatures in the tops of the filters in figures 2 and 3, and the separation around the base where the rolled seam is separating.

Figure 3, shows a burst filter case seam that resulted because a diverter plate and gaskets at the engine accessory case were incorrectly installed. To burst the seam typically requires over 600 psi pressure. When such pressures are reached the oil pump gears and drive assembly in the engine are put under extreme loads. It is possible that the oil pump gears and their drive system can be damaged by the high loads.

ALWAYS THOROUGHLY INVESTIGATE any burst filter case or seam and correct the problem(s) that caused it prior to further flight. The extremely high burst rating of aviation oil filters means that when a filter ruptures some malfunction/situation in the engine or oil system has caused the event.

A filter bursting from over-pressurization does not constitute a filter failure. It is a sign of an engine or system problem, or inappropriate operation of the aircraft/engine.

Starting an engine in extreme cold and allowing the rpm to race up can cause an oil pressure spike sufficiently high to burst an oil filter and/or oil cooler. Externally mounted filters are even more subject to over-pressurization under such circumstances since it may take longer for them to come up to normal working temperature than a filter mounted on the engine block.

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