

## Pressure relief valve repair

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The oil pressure had started to drop to a max of 30 psi when running hot at speeds above 2000 RPM. The dash gauge reading was checked with a bourdon gauge fitted to the front plug in the oil gallery. This showed the dash gauge was accurate so the next step was to investigate the pressure relief valve. There was wear on two of the flutes of the valve and also wear over only part of the circumference of the seat. It looked as though the valve wear allowed it to cock over so that the housing seat was not in contact all around.

A special tool was made up to reface the seat using valve grinding compound. The tool was precisely machined to fit snugly in the housing so that the seat plane would be as normal to the axis as possible. Once a full round pattern had been obtained, 600 grit paper was used on the tool to give a smoother finish.

A new bobbin and spring were fitted and I tried to see if the valve would hold a vacuum using the MityVac. It did not, but the gauge behavior suggested that the leakage was very small so I continued with the build. The bobbin was oriented so that the flutes were not aligned with the wear marks in the bore, pretty anal but there we are!

After the engine is fully warmed up and being driven reasonably briskly, the oil pressure showed a tad less than 40 psi – the needle being truly vertical – over a wide range of speeds from 2000RPM up. This is fine.

The old and new springs were compared and the forces they generated on the bobbin compared.

Old Spring Free length 2.155” Deflection 1.035” Rate = 7.9 lb/in Load on bobbin = 8.18 lbs

New Spring Free length 2.287” Deflection 1.176” Rate = 6.8 lb/in Load on bobbin = 8.0 lbs

So the new spring had a lower spring rate but with a bigger deflection the same force was applied to the bobbin.

The new bobbin had wider flutes so perhaps the wear will not be as great.

The conclusion therefore is that the valve was leaking and that this alone caused the pressure drop – the spring was fine.

The valve face is shown to be unevenly worn. The depression is only about 0.002-0.003". There was a mating wear pattern on the valve seat which is a steel insert in the aluminum casting.

Two of the flutes were worn allowing the valve to cock over.

It clearly does-not take much of a gap to affect the oil pressure.

