

confusing. Some say to use multi grade oil (MG manuals), some hypoid oil (Triumph manuals), some non detergent oil and some even recommend automatic transmission fluid! No wonder everyone is so confused!

Many years ago (in a land far, far away (OK it wasn't that far away or even that long ago)) we ran an experiment on overdrive oil. We rebuilt an A type overdrive unit and initially ran it with 30 weight non detergent motor oil. When spun up on our test bench at 1,000 RPM, it reached a normal pressure of 400 PPSI. When shifting the pressure dropped to 300 PPSI and quickly recovered to 400 PPSI. All was right in the world of overdrives.

We then drained the oil and replaced it with 10W30 multi grade oil. When spun on the test bench, initially it tested fine. However, after a few minutes of running, the oil pressure dropped to 300 and when shifting, to 200. Upon observation of the internals of the operating overdrive we found bubbles developing in the oil pump body and oil pump output passage. We surmised that the detergents in the oil were causing the oil pump to cavitate, and develop air bubbles as it pumped.

We then drained the oil again and replaced it with 90 weight hypoid oil. This time the oil pressure jumped to 600 PPSI! When shifted, the pressure dropped to 450 PPSI, which made the shift immediate and harsh. After a few minutes of running the oil pressure actually began to climb even higher. (Which made no sense since we thought the oil would thin out and the pressure would drop). We finally shut it off at 750 PPSI as we did not want to damage the unit. Even though the overdrive unit was now in the non overdrive position (solenoid disengaged), the overdrive was now stuck in overdrive and would not come out. The higher pressure had driven the sliding clutch member so hard into the brake ring that the clutch return springs could not return it to the non overdrive position. A tap on the brake ring with a hammer (the universal overdrive release tool), shifted it back into the direct drive position. After running a number of these test with the same result we found what was happening. The oil holes in the accumulator sleeve are very small. The 90 weight oil was so heavy it could not escape from the accumulator chamber as fast as the oil pump could pump new oil into it. So even though the accumulator piston had passed the oil hole relief position, the pressure continued to build up because the oil could not leave the system as fast as it was being pumped in. The accumulator piston actually bottomed out in the sleeve (similar to coil bind on valve springs). When removed we found the accumulator spring had been compressed and was no longer useable.

After replacing the spring, we then tried automatic transmission fluid. We saw the same results as we did when we used the 30 weight non detergent oil.

We then tried synthetic oil and the unit also worked OK although it began to leak from all sorts of places it had not leaked from before.

Based on these tests we have since and continue to recommend the 30 weight non detergent motor oil as the best oil to use in the overdrives.

Some other experiences with customer overdrives over the years have reinforced this choice. For example, we found a Jaguar compact overdrive with a broken accumulator piston and bent spring when it had been used with 90 weight oil by the owner. When the piston and spring were replaced and the unit filled with 30 weight non detergent oil, it functioned normally. A customer LH overdrive unit that was filled with 90 weight oil "pulsed" between direct drive and overdrive without even being switched on electrically. When the oil was flushed and replaced with 30 weight non detergent oil the unit worked normally.