Why Atf Wears Out

An automatic transmission creates a lot of internal heat through friction: the friction of the fluid churning inside the torque converter, friction created when the clutch plates engage, and the normal friction created by gears and bearings carrying their loads.

It doesn't take long for the automatic transmission fluid (ATF) to heat up once the vehicle is in motion. Normal driving will raise fluid temperatures to 175 degrees F=79 degrees c., which is the usual temperature range at which most fluids are designed to operate. If fluid temperatures can be held to 175 degrees F., ATF will last almost indefinitely -- say up to 100,000 miles. But if the fluid temperature goes much higher, the life of the fluid begins to plummet. The problem is even normal driving can push fluid temperatures well beyond safe limits. And once that happens, the trouble begins.

At elevated operating temperatures, ATF oxidizes, turns brown and takes on a smell like burnt toast. As heat destroys the fluid's lubricating qualities and friction characteristics, varnish begins to form on internal parts (such as the valve body) which interferes with the operation of the transmission. If the temperature gets above 250 degrees F=121 degrees c., rubber seals begin to harden, which leads to leaks and pressure losses. At higher temperatures the transmission begins to slip, which only aggravates overheating even more. Eventually the clutches burn out and the transmission calls it quits. The only way to repair the damage now is with an overhaul -- a job which can easily run upwards of $1500 on a late model front-wheel drive car or minivan.

As a rule of thumb, every 20 degree increase in operating temperature above 175 degrees F. cuts the life of the fluid in half!

At 195 degrees F=91 degrees c., for instance, fluid life is reduced to 50,000 miles. At 220 degrees, which is commonly encountered in many transmissions, the fluid is only good for about 25,000 miles. At 240 degrees F., the fluid won't go much over 10,000 miles. Add another 20 degrees, and life expectancy drops to 5,000 miles. Go to 295 or 300 degrees F., and 1,000 to 1,500 miles is about all you'll get before the transmission burns up.

If you think this is propaganda put forth by the suppliers of ATF to sell more fluid, think again. According to the Automatic Transmission Rebuilders Association, 90% of ALL transmission failures are caused by overheating. And most of these can be blamed on worn out fluid that should have been replaced.

On most vehicles, the automatic transmission fluid is cooled by a small heat exchanger inside the bottom or end tank of the radiator. Hot ATF from the transmission circulates through a short loop of pipe and is thus "cooled." Cooling is a relative term here, however, because the radiator itself may be running at anywhere from 180 to 220 degrees F.!

Tests have shown that the typical original equipment oil cooler is marginal at best. ATF that enters the radiator cooler at 300 degrees F. leaves at 240 to 270 degrees F., which is only a 10 to 20% drop in temperature, and is nowhere good enough for extended fluid life.

Any number of things can push ATF temperatures beyond the system's ability to maintain safe limits: towing a trailer, mountain driving, driving at sustained high speeds during hot weather, stop-and-go driving in city traffic, "rocking" an automatic transmission from drive to reverse to free a tire from mud or snow, etc. Problems in the cooling system itself such as a low coolant level, a defective cooling fan, fan clutch, thermostat or water pump, an obstructed radiator, etc., will also diminish ATF cooling efficiency. In some cases, transmission overheating can even lead to engine coolant overheating! That's why there's a good demand for auxiliary add-on transmission coolers.

Auxiliary Cooling

An auxiliary transmission fluid cooler is easy to install and can substantially lower fluid operating temperatures. The plate/fin type cooler is somewhat more efficient than the tube and fin design, but either can lower fluid temperatures anywhere from 80 to 140 degrees when installed in series with the stock unit. Typical cooling efficiencies run in the 35 to 50% range.