

Simple Tests for ATF Contamination

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Automatic transmission fluid, or ATF, is the lifeblood of your rebuilds. ATF literally drives the vehicle, while providing lubrication, cooling, and more. No doubt about it: ATF wears a lot of hats!

And to do that, today's transmission fluids must meet some seriously exacting standards. You've probably run into at least one transmission that chattered or slipped because the fluid didn't meet factory requirements. Just replacing the ATF took care of what seemed like a major problem.

So it should come as no surprise to you that even the smallest levels of contamination can have a serious effect on transmission performance and longevity.

What kind of contamination? In transmission fluid there are two common contaminants: water or engine coolant.

Now, once upon a time, water or coolant contamination was easy to detect. By the time it became severe enough to cause a problem, the contamination would turn the transmission milky, like a "strawberry milkshake."

But these days, even a tiny amount of water or coolant can begin to damage the transmission. So waiting until it's severe enough to become visible in the ATF is likely to cost you in terms of repeat transmission failure.



Sources of Contamination

There are a couple possible sources for water, but coolant contamination is likely to have come from only one place: a leak in the transmission cooler.

As we discussed in the last issue of *GEARS*, the cooling system operates under a lot of pressure when the engine

heats up: usually about 15–16 PSI (a little over one Bar). That pressure can easily force coolant through even the smallest leak in the transmission cooler.

The coolant will mix with the transmission fluid, contaminating it, and can cause irreversible damage to the transmission components.

Simple Tests for ATF Contamination

That's because transmission clutch material is *hygroscopic*; they'll literally push transmission fluid out of the clutch facings to absorb water. That water alters the clutches' ability to operate, and will eventually loosen the adhesives that hold the clutch facings to their backings. It won't be long before the transmission is toast.

While the cooler is really the only likely source for coolant contamination, there is another way that plain water can get into the transmission fluid. A number of transmissions have pulled water in through the vent, either because the vent was misplaced during a repair or because of a design flaw.

Identifying the Contamination

Because of the damage it can cause, it'd be a good idea to check for water and coolant contamination on each transmission you rebuild or repair. The tests are pretty easy and really won't cost much.

First you'll want to check for contamination from water or coolant; both

contaminants will show up with this test.

All you'll need is a hotplate and a clean pan. Just pour a small sample of the transmission fluid into the pan and put it on the hotplate to heat up.

Transmission fluid will burn and smoke, but if the fluid's contaminated with water or coolant, it'll start to boil and spit. Transmission fluid alone won't do that until the temperature gets way above anything you can recreate with a hotplate.

If the fluid's contaminated, your next step is to see whether it's plain water or coolant. For that you'll need to perform a *glycol test*.

Glycol is a primary component in most coolants, so evidence of glycol in the transmission fluid is pretty conclusive proof that the transmission cooler is leaking.

There are several different glycol test kits on the market, but most are fairly expensive: They cost anywhere from \$6 to \$20 per test.

A less expensive way to test for glycol is with a test strip from Acustrip.

Their automatic transmission fluid test strip for glycol contamination is available from CAT Products (www.run-rite.com) in jars of 50 for \$25, so it only costs fifty cents per test — not bad for the assurance it offers.

And the test strips are easy to use:

- Apply a drop of the sample fluid to the test strip pad.
- Let it sit for 15–30 seconds, then lay the strip against a clean paper towel to let the excess fluid wick off.
- Wait another 30 seconds, then compare the strip pad color to the sample patches on the jar.

If the test strip indicates any glycol in the fluid, you can assume there's a leak in the transmission cooler. If the test pad indicates zero percent glycol, you can assume the contamination is pure water, probably entering through the transmission vent.

Correcting the Problem

So how do you correct contamination in the transmission fluid? First you have to fix the source of the contamina-

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tion. If there's evidence of glycol in the transmission fluid, you have three basic choices:

- Replace the radiator (or the cooler if the car uses an external one).
- Take the radiator to a radiator shop to have the cooler replaced (not possible for all radiators).
- Bypass the cooler and install an external transmission cooler (may not provide adequate cooling for all transmissions).

If the contamination is plain water, with no sign of glycol, suspect the water is entering the transmission through the vent. Check for any bulletins about this type of problem; many manufacturers have updated their vents to correct this condition. They may also have a bypass for redirecting rainwater, to keep it from leaking onto the transmission vent.

If there are no bulletins, try moving the vent. This may require adding a hose or pipe to the vent, to raise it away from where water is pooling.

That'll take care of future contaminations, but what about the contami-

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nated transmission? If you're already rebuilding the unit, that should take care of the problem. Just make sure you flush out any remnants of the contaminated ATF.

What if the transmission is still operating? If the transmission seems to be working okay, you may be able to buy the customer some time with a simple transmission fluid exchange.

But there are no guarantees: The flushed transmission may last another 50,000 miles, or it may fail next week. You have to warn the customer about the possible effects of the contamination, and make sure he or she accepts responsibility for the repair decision.

And, for your own safety, get permission in writing:

"I understand that my car's transmission was contaminated with water/coolant and that this can eventually damage my transmission. I've asked to have my transmission fluid changed in an effort to extend the transmission's life. I understand that this may not be successful, and I accept full responsibility if the transmission fails after the service is performed."

While this may not provide absolute legal protection for you in the event of a transmission failure, it does acknowledge that you explained the problem to the customer, and he or she was fully informed of the possible outcome.

ATF is an amazing fluid: It lubricates, cools, and even drives the transmission. But even the slightest contamination can hamper its ability to protect the transmission. So it only makes sense to check the fluid during every rebuild or major repair, to look for signs of contaminants.



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