

Trouble Shooter



Bob Savasta

Four heater cores in a year force a shop owner to reevaluate his diagnostic strategies on a Ford F-150. We chime in with some ‘jolting’ reminders.

Electrifying Experience

I read your May column on electrolysis and its effect on aluminum cooling system components with great interest. For the past 12 months, we’ve been doing battle with a 1997 Ford F-150 with this exact condition.

To date we’ve installed four heater cores in this vehicle, all lasting between two and six months. We’ve flushed the cooling system numerous times, have checked all ground connections and even added a separate ground to the heater core the last time the truck was in. Despite these measures, the meter reading we’re getting from the coolant is 757mV—way too high! We’re obviously missing something on this truck, but don’t know what it might be. The

labor time for core R&R is seven hours, so, as you can imagine, we’d like to get to the bottom of this situation as soon as possible. Any helpful suggestions would be sincerely appreciated.

*Jim Barlogio
Visalia, CA*

Flushing and refilling a cooling system with fresh antifreeze is critical to restoring proper system pH, and absolutely vital to the longevity of aluminum components, Jim. However, as I mentioned in my May column, getting out the majority of the old coolant can be a bear today, due in large part to the intricate coolant passages of modern engine designs. And if you can’t get enough of the old stuff out, it stands to reason you won’t get enough of the new stuff in. This may be playing a role in the repeated core failures of your customer’s F-150.

If you don’t own, or can’t get your hands on, a good coolant exchanger (drain & fill machine), I suggest you manually drain the radiator, engine block (pull the lower rad hose if it doesn’t have a drain cock) and heater core, then refill the system with plain water. With the temp lever on High, start the engine, let it run until the stat opens, shut it down, then drain again. Many carmakers recommend that you repeat this procedure two or three more times to get out most of the old coolant. Notice I said “most”? Using even the best drain & fill machine or multiple manual drains, the best we can hope for these days is about a 90% success rate. However, that’s usually sufficient to allow enough new antifreeze into the system to bring pH back in

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Photo: Bob Savasta

Systematically pulling fuses or disconnecting individual components while your voltmeter probe is planted in the radiator neck should help you identify the circuit responsible for excess voltage in the cooling system.

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check and afford protection to the aluminum.


Cleaning ground connections as you did is always a smart idea when confronted with electrolysis. But what we often forget is that the entire ground *circuit* must have good integrity to ensure adequate isolation of stray voltages. High-heat, crammed engine bays can do a number on wire insulation, which, in turn, will lead to excess circuit resistance. As a precaution, I'd grab my DMM and do voltage drops on all the ground circuits previously checked. Anything over 100mV is cause for concern and should be immediately addressed.

When you encounter a parasitic electrical drain, what do you typically do in the way of diagnosis? Probably grab a meter, hook it up in series with battery positive (or use a current probe), turn on all circuits, then systematically remove one fuse at a time until you've identified the circuit with the excess draw.

Well, you can use the same basic approach to flush out (no pun intended) an electrolysis problem. About the

only difference is that you'll use the voltage setting of your meter, with one probe stuck in the radiator neck and the other attached to ground. Turn on all circuits to establish a baseline voltage (757mV in your case), then simply disconnect components or remove fuses until the coolant voltage comes back within an acceptable limit (300mV or less). Once you've identified the problem circuit, it shouldn't take you long to nail the source and effect a permanent repair.

One last point: In your letter, you mention that you added a ground directly to the heater core. With all due respect, I don't quite see the wisdom here. Seems to me, adding a ground at the core would only complicate matters because it makes it easier for the current to go through the core and coolant, and return via the ground connection. In effect, you're helping to complete a circuit!

If anyone has seen similar problems on Ford F-150s, thinks he has a solution or would just like to add to the discussion, drop me a line and I'll make sure Jim gets the info. 

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