



Cooling System Diagnosis

Due to developments such as front wheel drive, aluminum/plastic radiators, and aluminum head and block castings, the cooling system isn't what it used to be. Many of us are learning the hard way that we've got to take cooling system service more seriously these days. We're learning that the systems are tougher to diagnose and more expensive to repair. And today's systems, cooling specialists tell us, just don't tolerate abuse and neglect the way older systems did.

Several cooling system specialists shared the following tips with us. Some of the points may sound almost trite, but these very points are ones that are

overlooked more often than you realize.

General Reminders

1) Know your antifreeze. Be sure the antifreeze you're buying is aluminum-safe. Most brands are, but you never know until you check. If the vendor or supplier can't verify that his product is aluminum-safe, shop elsewhere.

Be aware that Volkswagen requires phosphate-free aluminum-safe antifreeze for all its water-cooled engines. Reportedly, the phosphate-free antifreeze

reduces both solder corrosion and aluminum erosion. Unfortunately, the phosphate-free is still available only from Volkswagen.

2) Use aluminum-safe flushing chemicals. If you're still using up those cases of flush you bought cheap when Harry's truck shop closed, then watch out! Even if you are using a safe flushing agent, always flush that stuff thoroughly out of the system with clean water.

3) Keep an eye on those water pumps. On many import engines, the cam belt drives the pump and its cover conceals the pump. Remember that a sloppy water pump can eventually ruin a good cam belt. And because the pump is so hard to see, it may take a long, long time to notice a pump leak. Like certain pinhole leaks, the pump can seep for some time before the

coolant actually hits the ground.

Because of the time, dollars, and inconvenience involved, many shop owners we know automatically sell a new water pump with a cam belt R and R.

4) Get accustomed to pressure-testing heads. Some guys used to joke that Saab heads were the only ones anybody worried about. But at many machine shops, pressure-testing aluminum heads has become standard procedure—and the price reflects it. Why? Because in so many cases, it's the only way to verify the condition of the head and guarantee the job.

5) Aluminum/plastic radiators sometimes distort and seep coolant where the tanks join the core. Watch for that seepage. And yes, more all-metal replacement radiators for imports are becoming available.

—By Dan Marinucci



1

MUSHROOMED RADIATOR CAP GASKET

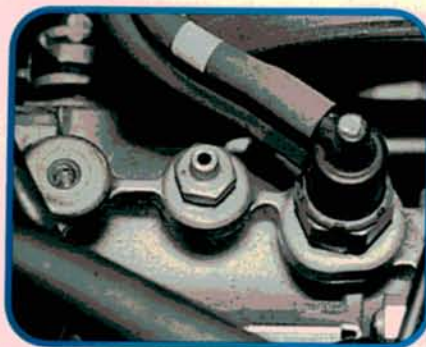
Whenever a cap doesn't come off easily—or when you know the radiator or heater core has split open—check for a mushroomed cap gasket. A mushroomed gasket can jam the cap's pressure valve so the cap can't vent off excessive system pressure.



2

FAN SWITCH GROUND

Many control switches for radiator cooling fans ground themselves directly to the engine. Whatever you do, don't disturb that ground by wrapping the switch's threads with sealer tape or coating them with RTV/silicone sealer.



3

HONDA COOLANT BLEEDER VALVE

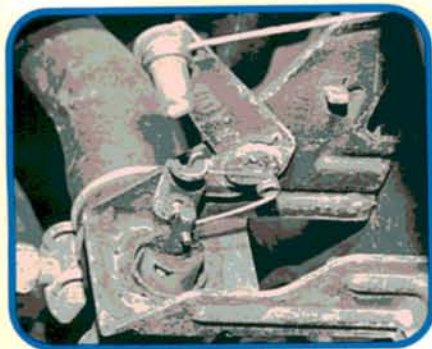
When you're filling a Honda, crack open this bleeder fitting. Fill the radiator until coolant runs out of the bleeder in a solid stream. Then snug up the bleeder and top off the system. Bleeder sits slightly above the 'stat in the 'stat housing.



4

HANDLE PLASTIC WITH CARE

More and more import vehicles are using plastic radiator tanks. And more and more radiator specialists are reporting cases of plastic radiator abuse. Believe it—if you don't take your time, you will crack that neck. Then it's new-radiator time.



5

WHICH ONE'S LEAKING

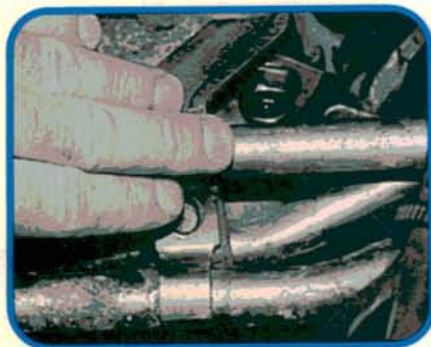
The heater control valve on some cars is buried inside the dash near the heater. When you find coolant on the carpet, take extra care pinpointing the leak. Lots of guys have eaten heater core R and Rs for want of a new heater control valve!



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THIS END UP!

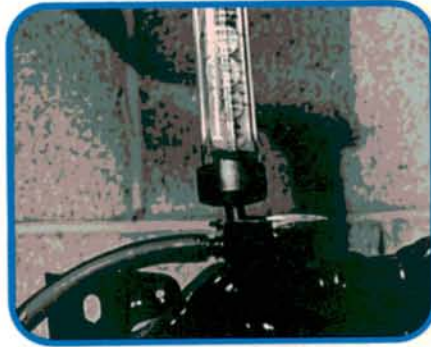
Always install this style of 'stat with the bleed hole at the top. Bleed hole helps the system expel trapped air quicker when you're filling the radiator. Bleed hole lessens the chances of localized hot spots occurring and damaging the engine.



7

COOLANT TUBE PINHOLES

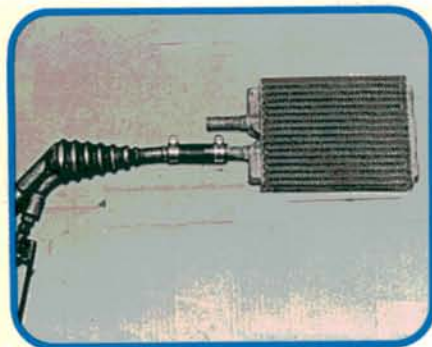
Beware! Pinholes in a coolant tube can allow the coolant to spray out and evaporate before it hits the ground. Or, the coolant may run along the tube and actually drip far away from the original leak. Pressure test and watch very, very closely.



8

60/40 IS THE LIMIT

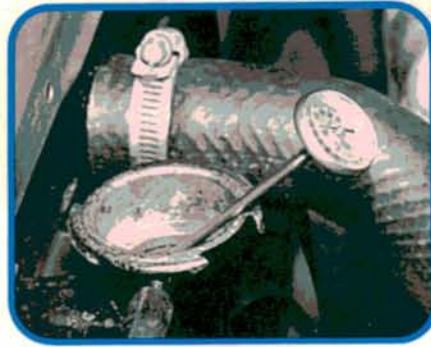
Don't overdo it! When you go beyond about a 60/40 antifreeze/water mix, the freezing point goes up! A 50/50 mix takes the freezing point down to -34 degrees F. But 100 percent antifreeze only takes it down to -8 degrees F.



9

FLUSH GUN REQUIRED

Okay, the heater ain't heating and the inside of that system resembles the Big Muddy. Your trusty old flush chemical may not solve this one. Often, the only fix is a serious flush job by a serious radiator man with a serious flush gun.



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THERMOSTAT TREACHERY

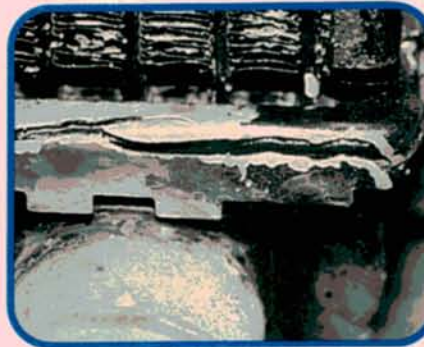
Is a car running richer than you think it should? When all else fails, check the thermostat's opening point. When a 'stat sticks open or opens too soon, the coolant sensor's likely to keep signalling the computer for a richer fuel mixture.



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WON'T GET FOOLED AGAIN

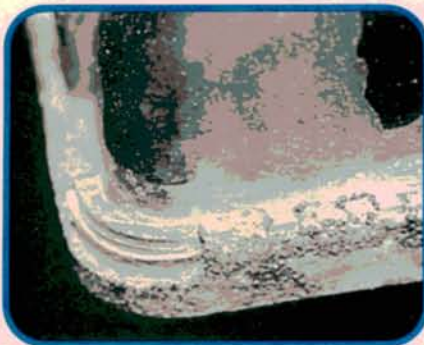
Troubleshooting a driveability problem? Remember that a low coolant level will trick the coolant sensor into sending false signals to the computer. Yes, Virginia, topping off the coolant really can make the car run better in the morning!



12

INTEGRAL RETAINING BAND

On this Rabbit radiator, the metal retaining band that holds the core and tank together is part of the core itself. So if the band cracks, you have to recore or replace the radiator. Here, the crack reveals the rubber core-to-tank sealing gasket.



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RETAINING BAND RUSTS OUT FIRST

Sometimes, salt splash destroys this metal retaining band on plastic radiator tanks (Toyota and others) before it destroys the radiator core! In most cases, a competent radiator man can save the radiator by replacing the metal band for you.



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RECOVERY COOLANT LEVEL

Easy check? Mark the recovery bottle coolant level when the engine's hot. Before you pull the car into the shop in the morning, see if the coolant dropped. If the system's tight, it will draw coolant back into the radiator when the engine cools down.



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SUBTLE SUSPECTS

Why the vacuum gauge reminder? Because basic engine problems such as late timing and exhaust restrictions can cause or aggravate overheating problems. Suppose you never road-tested the car and the customer forgot to mention poor performance.



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RADIATOR VOLTAGE CHECK

Clip one voltmeter lead to the brass neck. Carefully dip the other lead into the coolant but don't let it touch metal. A reading over three volts tells you it's time to flush the system.