

# fast times

the newsletter of **Bavarian Autosport**

summer 2005

## **NEW!** Bavarian Autosport high-performance coils: added firepower for most BMWs 92 thru 04.



What makes them high-performance? Without giving away any secrets, we can tell you that the core windings have been modified to double the secondary spark. This promotes a faster, more efficient burn, which in turn gives your BMW more horsepower, more torque and better fuel economy.

### **Increased power.**

The horsepower increase is especially noticeable above 5000 rpm, while the higher torque is more pronounced in the lower end. What kind of performance boost can you expect? Depending on the age and model of your BMW, you should add 4 to 7 hp. We'd love to be more specific than that and list the precise gains for every single BMW model, but when it comes to ignition enhancements, so much depends on the current condition of your Bimmer's engine. For example, if you have a '92 325i with 180,000 miles on it and you've never changed your coils, you'll probably notice a bigger improvement

than somebody with an '04 330i. Rest assured, however, the "butt-o-meters" on both drivers will register the gain.

### **Improved fuel economy.**

How much? Again, it depends on your BMW, but you should see an improvement of 3 to 6%. This, of course, is assuming you don't develop a case of "pedis plumbum", (Latin for "foot of lead", a common affliction that tends to show up immediately after installing a new performance upgrade, and significantly lowers your mpg).

How do we know your mileage will improve? We devised a blind test to find out. We chose a 2001 325xi that rarely does anything besides commute to work and take the kids to practice – a nice mix of highway and stop-and-go driving. Without the owner's knowledge

(so he wouldn't drive differently), we installed a set of our high-performance coils and reset the mileage computer. Up to that point (2,000 miles into ownership), he'd averaged 23.4 mpg.

2,000 miles later, with the same driver in the same car over the same roads, the computer showed 24.5 mpg, an improvement of 4.7%. For a 3 series 99 on, that's like getting an extra 3/4 gallon of gas in every tank! (And at \$2/gallon, that's nothing to sneeze at.) By the way, when we told the driver what we had done, he said, "I wondered why my BMW felt peppier!"

Our new high-performance coils are available for most BMWs 92 on with direct-fire (a.k.a. coil-on-plug) ignitions. They are compatible with all OEM components. Plus they're easy to install – just take off the engine cover, remove the old coils and put the news ones in. It'll take you less than 30 minutes. (See the Spring 2005 issue of Fast Times: [www.BavAuto.com/newsletter](http://www.BavAuto.com/newsletter).)

Now for the best part – they cost less than BMW stock coils! For a 6-cylinder OBD-I car, the total is \$274.95. For a OBD-II 6-cylinder, it's \$449.95; and for an 8-cylinder, it's \$599.95. All include new spark plug boots, saving you even more! Plus, like all Bavarian Autosport brand products, they're backed by our 2-year/24,000-mile warranty.

*Ed. Note: at press time, our high-performance coils were scheduled to start shipping in mid-July. Please call to confirm availability.*



*Have a question about  
your BMW? Ask that savvy  
old BMW enthusiast,  
"Bavarian Otto".*

*See page 3...*

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**BAVARIAN**  
autosport

PRODUCTS FOR BMW ENTHUSIASTS

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# Product Focus: The ANSA® Sound of Power.™



Here at Bavarian Autosport, we've been selling ANSA exhaust systems for more than 20 years – longer than any other exhaust line we offer. Why? Year after year, ANSA free-flow systems represent one of the best exhaust values in the world. ANSA Sport exhausts give you increased performance and outstanding sound at a very reasonable price.

While most of our customers are familiar with the ANSA name from seeing it in our catalog, many don't know that ANSA is the original equipment supplier to Ferrari. (And they have been for decades!) The Sport exhausts ANSA makes for BMWs are similarly engineered to maximize performance and produce the unmistakable "ANSA Sound of Power." Many BMW enthusiasts believe their ANSA Sport exhausts deliver the perfect balance between performance and aesthetics. The free-flow design increases engine performance by decreasing back pressure. (When you put an ANSA Sport system on your BMW and step on the gas, you can immediately feel the added power in the seat of your pants.) And that famous ANSA sound is sporty and rugged, yet won't rattle your neighbors' windows.

#### Other features of ANSA include:

- Aluminized muffler shells for superior durability.

- A rich, black finish for added protection and styling.
- On the newest applications, robot-welded seams and muffler boxes with stainless steel internal components.
- Polished stainless steel or chrome tips that look sharp on any BMW.

In addition, ANSA's bolt-on design allows for easy installation and a precise fit. All units are 50-state street legal, and they're available for an array of BMW models. (See listing below.)

ANSA muffler prices normally range from \$109.95 to \$649.95, but for a limited time, they're on sale at 10% off. That means you can enjoy a performance boost and the famous ANSA sound of power for not much more than the cost of a stock replacement exhaust. (For example, a replacement exhaust for a '92 325i costs \$224.95; the ANSA Sport is on sale for \$314.95 – just \$90 more for beefed-up power, better sound and polished tips.) For exact pricing for your year and model BMW, call 800.535.2002 or visit [BavAuto.com](http://BavAuto.com). Don't delay – sale ends August 31st.

#### ANSA Sport is available for:

2002, 2002tii  
320i  
3 series 84 thru 91 (except M3)  
3 series 92 thru 98  
525i 89, 90  
Z3 (except 3.0)  
M coupe/roadster

## Don't let the sun catch you crying... get a shade!

Every summer we tell people the benefits of putting a Bavarian Autosport windshield sunshade in their BMWs. We even put them on sale to encourage people to buy them. Hey, we live in New Hampshire, where it gets above 80° maybe 8 weeks out of the year. But even here, what a difference a sunshade makes! If your BMW is ever parked in the sun, you should have one. Here's why:



1. It's custom-cut to fit your BMW's windshield precisely, so it provides complete protection (no gaps), looks great installed (again, no gaps) and makes installation a simple matter of unrolling the shade, sliding it over the dash and flipping the sun visors down to hold it in place (no velcro or tape).
2. It increases your comfort tremendously, keeping the temperature inside your BMW up to 40° cooler. (The manufacturer lives in SoCal and has tested this extensively.) You'll also notice that your seat, steering wheel and shift knob are much more comfortable to the touch. (No more seared thighs or fingertips!)
3. It provides protection against costly UV damage to your interior. Cracked dashboards, cloudy wood trim, faded leather – these are all very expensive to repair. Left unrepaired, they drastically affect your BMW's trade-in/resale value.

Once you start using our sunshade, you'll wonder why you didn't get one years ago. (Have we convinced you yet?... What's that?... Okay, we'll put them on sale again. They're normally \$39.95; buy one by August 31 and we'll knock \$5 off the price.)

## Turn your hot seat into something totally cool.

On hot summer days, a sheepskin seat cover lets you to sit in your BMW in total comfort wearing nothing but a bathing suit.

But not everybody likes the look of a full sheepskin seat cover. We have the solution: we combined genuine sheepskin with genuine leather to create this handsome, innovative upgrade. It gives you cool comfort where you want it while maintaining the fine leather appearance of your interior. It's available for front and rear seats. (The rear seat cover has a zip-out section that allows you to adjust the width so it can fit a 3 series or 7 series.) Matching headrest covers are included. One size fits most BMW seats, including new Minis. And right now, they're on sale. Front seat covers – regularly \$129.95 – are now just \$109.95. Rear seat covers – regularly \$199.95 – are now just \$169.95. And full sets (two front seat covers, a rear seat cover and 4 headrest covers) are reduced from \$429.95 to \$364.95. Black with charcoal only.





from our tech team

# ask "bavarian otto"

Dear Readers:

The single, biggest BMW tech issue at this time of year is engine overheating. We asked Otto to write us a detailed "how to" on diagnosing and repairing the most common causes of overheating. His article turned out to be so comprehensive, it could have been broken out into several articles spread out over two or three editions. But the topic is so timely during the summer months, we decided to present the article in its entirety. As a result, there is no poster in this issue. Look for a new one in the fall. And now, here's Otto...

## Too hot to handle? or

'Tis the season for cooling system woes. We see it every year, as soon as spring breaks into summer, the calls and e-mails center around overheating BMWs. Be it a well worn '79 320i, a pristine '89 M6 or a rather new '99 740i, they all eventually start showing signs of needed cooling system maintenance or repair.

The cooling systems on our BMWs are fairly simple, once you understand what's involved, but they do include a few different parts and systems within the vehicle. Each of these parts must be doing its job correctly or we end up with a cooking BMW and quite possibly a ruined day or worse yet.... a ruined vacation.

In order to properly inspect and diagnose a BMW cooling system, we first need to understand it. Here are the major parts of the cooling system that can typically fail and cause problems:

**Coolant** – Typically a mixture of water and antifreeze, it performs many tasks:

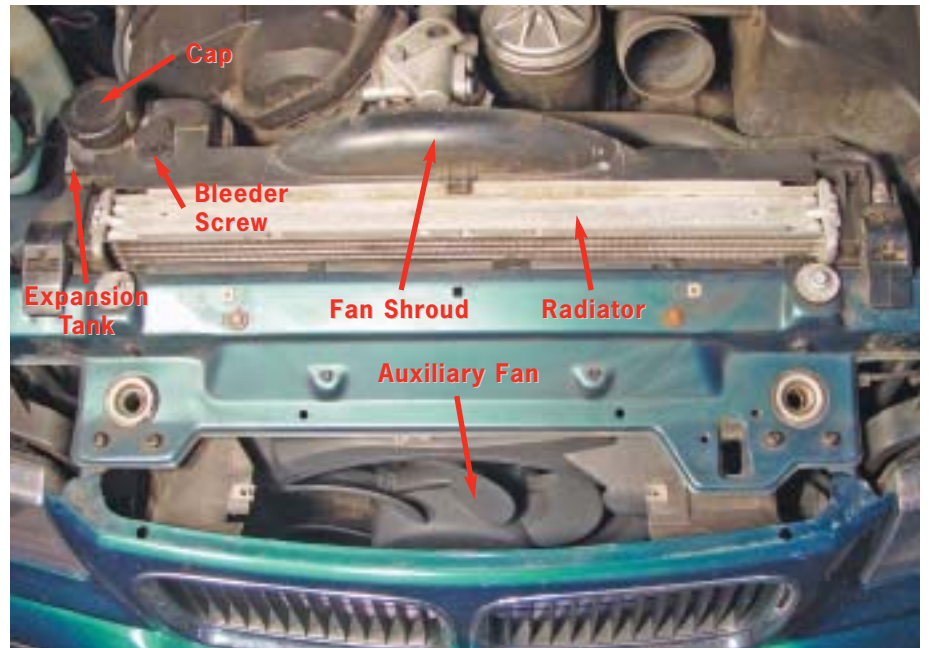
- As its first priority, the coolant absorbs heat from the engine, then releases the heat to the radiator.
- The antifreeze in the coolant mixture has anti-corrosive chemicals to help prevent corrosion in the radiator and engine.
- The antifreeze also contains lubricative chemicals to help prolong the life of the water pump.
- The antifreeze prevents the coolant from freezing in cold weather by lowering the freezing point of the water/antifreeze mixture.
- The antifreeze helps prevent the coolant mixture from boiling as the engine temperature goes up by raising the boiling point of the water/antifreeze mixture.

*NOTE: Unless your climate calls for a greater ratio than 1:1 ratio of water to coolant, never use more than 50% antifreeze. Doing so will actually reduce the heat transfer capability of the coolant mixture, due to the fact that the antifreeze does not conduct heat as readily as water. Therefore, the more antifreeze you have in the system, the less heat it can transfer. On the flip side, too little antifreeze will lower the boiling point of the coolant mixture, causing the engine*

Over 200 years of BMW experience is just a phone call or e-mail away.



If you add up all the years the enthusiasts at Bavarian Autosport have been working on BMWs – and helping people like you work on theirs – it totals well over 200 years. That's a lot of BMW knowledge. And it's yours for the asking. Have a BMW question? Ask that savvy old BMW enthusiast, "Bavarian Otto" – just call 800.535.2002 or e-mail Otto@BavAuto.com.



Typical late model BMW (3 series 92 thru 98 shown).

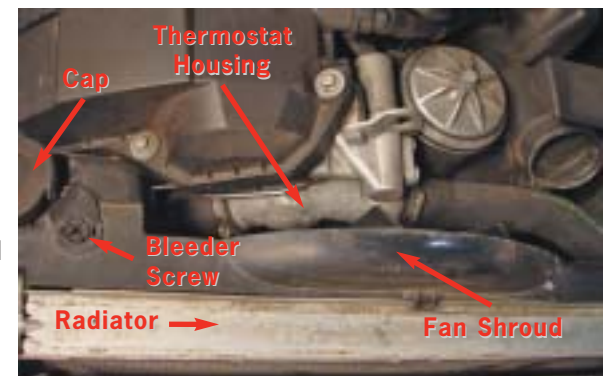
to overheat. Also, it is always recommended to use distilled water in the coolant mixture to help prevent corrosion caused by minerals in tap water. An excellent alternative is NPG+ waterless coolant. (See blue box on page 6.)

**Radiator** – Transfers heat from the coolant to the air. The heat is transferred from the coolant to the tubes in the radiator. From the tubes, it is transferred to the grid of small fins, where it dissipates into the air.

**Cap** – The cooling system (radiator) cap not only keeps the system closed, but allows a build-up of pressure in the cooling system. As the coolant heats up, it expands and builds pressure in the system (up to the point of the cap's rated maximum pressure). This allows the coolant to run at a temperature higher than 212° F (the boiling point of water). For each pound per square inch (lb/sq.in.) of pressure, the boiling point of the water/antifreeze mixture is raised by 2.7° F.

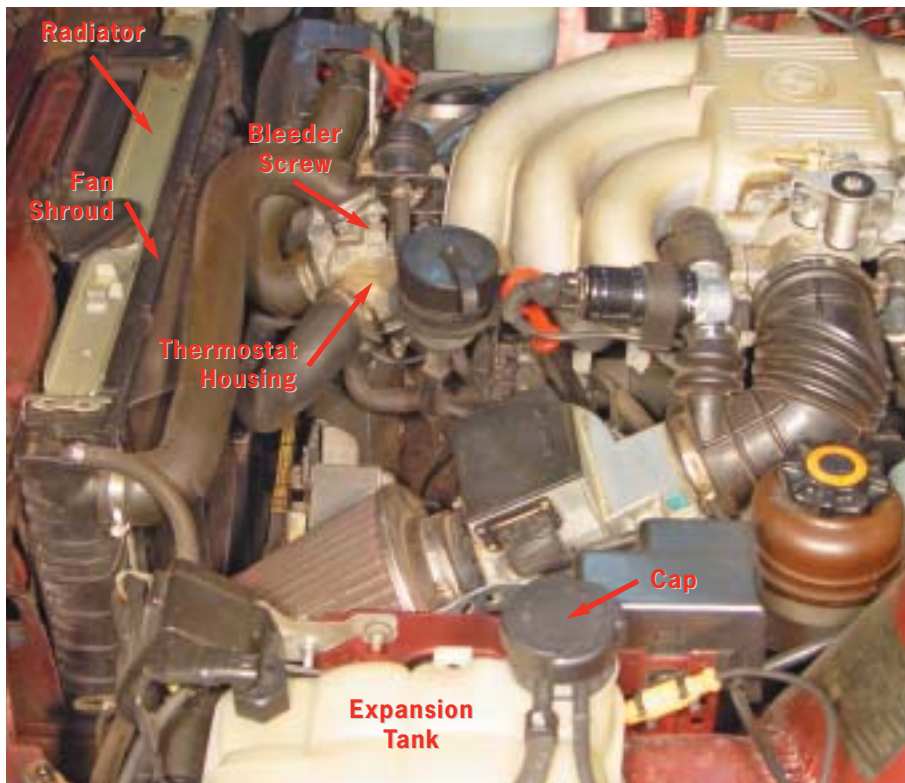
**Water Pump** – Moves the coolant through the engine to the radiator.

**Thermostat** – A valve that opens and closes to control the flow of coolant from the engine to the radiator in order to regulate the temperature of the engine. If there were no thermostat, the engine would run too cool in the winter time. (The thermostat effectively slows the flow of coolant through the radiator in order to keep from over-cooling the engine). It must be understood that the thermostat only regulates the engine from running too cold, as mentioned above: the thermostat does not regulate the upper temperature of the engine. Once the engine is running at a temperature above the normal running temperature, the thermostat is fully open and will not close until the engine comes back down to a lower temperature. Therefore, a higher temperature thermostat will not cure a hot running engine. (Unless, of course, the original thermostat is faulty in the first place.)



Typical late model BMW (3 series 92 thru 98 shown).





Typical early model BMW (3 series 84 thru 91 shown).

**Engine Fan** – Pulls air over the radiator when the vehicle's speed is too low (e.g. stop & go driving or idling), to force air through the radiator. *Note: 3 series 6-cylinder models 99 on with manual transmission do not use an engine fan.*

**Radiator Fan Shroud** – Improves the engine fan's efficiency by directing the fan's airflow fully through the radiator.

**Fan Clutch** – A BMW's engine fan is mounted to a thermostatically controlled clutch (mounted to the water pump pulley). When the air coming through the radiator is below the clutch's temperature rating, the clutch allows the fan to freewheel. This creates less noise and uses less horsepower. As the air coming through the radiator gets hotter due to reduced airflow (e.g. stop & go driving), the clutch thermostat engages the fan so that it pulls additional air through the radiator.



**Gordon Arnold (a.k.a. Otto)**

Gordon grew up in the Motor City (Detroit). His love for internal combustion started with repairing his neighbors' lawn mowers, which then grew into hot rodding go-karts and mini-bikes, and eventually to owning, driving and building high HP hot rods. He started working at Bavarian in June of 1991. Over the past 14 years he has owned a long string of

BMW's, including multiple 3 series thru 91 (several Euros among them), and many 5 series thru 88, including an M5. He now has his entire, extended family driving BMWs – 9 in all! In addition to being Sales Manager here, Gordon plays the demanding role of Bavarian Otto. (Since Otto debuted 2 years ago, Gordon has answered or edited over 5,000 BMW tech questions!) He is often asked to contribute to the Tech columns in *Bimmer* and *Roundel*, is a past-president of the BMW CCA White Mountain chapter and attends CCA driver schools at New Hampshire International Speedway (which he believes includes Rt. 16, the road he drives to and from work).

**Auxiliary Fan** – Electrically operated fan that is mounted in front of the radiator and A/C condenser. The auxiliary fan is operated via thermostatic switches in the radiator (earlier models have two separate switches, later models have one switch with two temperature settings). The switches will close and turn the fan on as the coolant temperature rises. As the temperature of the coolant rises above what the system can handle, first the low speed switch comes on. If the coolant temperature continues to rise, the high-speed switch will come on.

Ok, now that we have a better idea of what the parts are and how they interact, let's look at some typical problems and the associated diagnostic steps. But before attempting to diagnose ANY overheating problem, verify the following. (Any of these points could cause any or all of the symptoms described later.):

1. The system is full of coolant and the mixture is no greater than 50% antifreeze (when using a water/antifreeze coolant mixture).
2. There are no broken blades on the engine fan.
3. There are no visible coolant leaks.
4. The radiator fan shroud is in place.
5. The accessory drive belts are in place, tight and not fraying. (Slipping water pump belts can give symptoms similar to corroded radiators.)
6. Finally, make sure that the front of the A/C condenser and the radiator are not clogged with debris (which will limit airflow).



Auxiliary Fan

**Common overheating issue #1:**

*"My BMW overheats at idle or in stop-and-go driving. However, it's just fine when I'm driving along at 40 mph or more, even if it's very hot out or I'm going up hills."*

When moving at the slow pace, there is little forced airflow through the radiator and the heat transfer from the radiator to the air is very poor. Conversely, when moving at the faster speeds, there is a very good forced airflow over the radiator and the heat transfer is very efficient. Therefore, we are dealing with a problem of low airflow at the low speeds. This is where the engine fan and the auxiliary fan come into play. The purpose of these fans is to mechanically force air through the radiator. If either is not functioning properly, we see problems at low speeds.

**Possible Cause A:** The engine fan thermostatic clutch may be faulty and allowing the fan to freewheel at all times – test the clutch as follows. *[NOTE: 3 series 99 on with manual transmissions do not have an engine mounted fan (or fan clutch).]*



Engine Fan

1. With the engine and radiator cold, start the engine and run it for a minute or so.
2. Take a rolled up section of newspaper and gently push it into the back of the rotating fan. With the engine and radiator cold, it should be easy to stop the fan.
3. Let the car run or go for a short ride to get the engine hot. Let it sit and get to midway on the temp gauge.

4. Using the rolled up newspaper, gently try to stop the fan again; it should be noticeably harder, or nearly impossible, to stop.
5. If you can stop the fan just as easily as when the engine was cold, you need a new fan clutch.



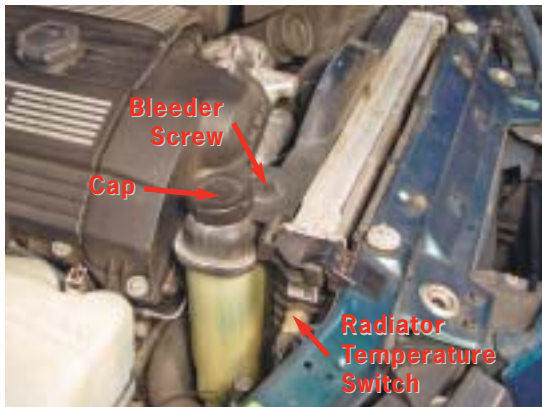
Fan Clutch

**Possible Cause B:** The electric auxiliary fan may be faulty, the fan's low speed resistor may be faulty or the radiator temp switches (that control the fan) may be faulty. Test the switches, resistor and the fan as follows. [NOTE: Testing the radiator temperature switches is a very important part of the diagnosis procedure. Although the testing is fairly easy and straightforward, the detailed description for the diagnostic steps is rather lengthy. We provide the basics here. For more detailed step-by-step instructions, consult a Bentley or Haynes repair manual.]

1. With the engine running, turn on the A/C.

2. Look through the front grill and see if the auxiliary fan is turning. If it is, the resistor and the fan are OK and you should test the radiator temperature switches. If the fan is *not* running, either the resistor or the fan are faulty. We will make a determination as to which is faulty while testing the switches.

3. Locate the thermostatic fan control switch(es) on the radiator. Most models through '88 have two switches; later models have one dual-range switch.



Typical Late Model BMW (3 series 92 thru 98 shown).

NOTE: Models '99 and later do not have a radiator-mounted temperature switch. These models have a cylinder head coolant temperature switch and a radiator coolant outlet temperature sensor. These sensors give input to the ECM (Engine Control Module) which controls the auxiliary fan and thermostat electrically. Diagnosis on these models requires checking the ECM for fault codes (using a code reader & reset tool like the one offered by Bavarian Autosport, or the BMW MoDiC or DIS machines at the dealer).

4. With the engine running, jump the wires from the radiator temperature switch(es) to determine if the fan comes on at low and high speed. (For greater detail, consult your Bentley or Haynes repair manual.)

5. If the fan does not run with the wires jumped, use a voltmeter to test for 12 volts at the power wire on each switch. If there is power in one wire for each switch, your auxiliary fan is faulty. If there is no power at any of the wires, you either have blown fuses, faulty auxiliary fan relays or a fault in the wiring.

6. If the fan does not operate on low speed, but does on high speed (and did not operate when the A/C was turned on in the prior steps), the low speed resistor is faulty. If this is the case, ignore steps 7-9 until the resistor is replaced.

7. With the A/C turned off, perform steps #3 & 4. The fan should operate at both low and high speed.

8. Plug the temp switches back in, let the engine run and keep an eye on the temperature gauge. The low speed temp switch should turn the fan on at low speed somewhere between 1/2 and 3/4 on the temperature gauge. The high temp switch should turn the fan to high speed at close to the 3/4 mark or just before the red section of the gauge. DO NOT LET THE TEMPERATURE GO PAST THE BEGINNING OF THE RED SECTION OF THE GAUGE. Turn the engine off if it gets this hot and the fan does not come on.

9. If the fan did not come on at all, it is likely that the temp switches are bad.

NOTE: the original temp switches are set at relatively high temperatures. Bavarian Autosport offers lower temp switches that will turn the fan on at a lower temperature (to help prevent runaway overheating), for most applications. This is a good idea even if your original switches do eventually turn the auxiliary fan on.

## Common overheating issue #2:

*"My BMW is fine at slower speeds (but not at faster speeds) or is OK at faster speeds as long as I don't have to climb any hills or as long as it's not real hot (even when going over 40 mph). In other words, it overheats when it's working harder, but can be fine on all but the hottest days or as long as I don't go too fast or climb a big hill."*

In this scenario, there is plenty of airflow through the radiator as the vehicle is moving at 40 mph or more. Therefore, we do not need to address the fans at this time. (At 40 mph or more, we should be able to remove the fans from the vehicle and never know the difference.) Our problem now revolves around a lack of heat transfer from the coolant to the radiator or the radiator to the air (although we know it's not an airflow issue). We could also be dealing with a thermostat that is not fully opening and is limiting the flow of coolant.

**Possible Cause A:** You may have more than 50% antifreeze in your coolant mixture. Test the coolant mixture with a hydrometer. Drain and replace with the proper mixture if needed.

**Possible Cause B:** Your water pump drive belt may be slipping due to looseness or glazing of the belt running surfaces. Tighten or replace the belt.

**Possible Cause C:** The radiator is possibly corroded internally which will reduce the efficiency of heat transfer from the coolant to the radiator. The radiator must be replaced.



Radiator

**Possible Cause D:** The radiator is possibly corroded externally which will reduce the efficiency of heat transfer from the radiator to the air. Run your finger along the thin fins that are between the coolant tubes, on the radiator. Do this in various places on the radiator. If the fins easily fold over, or even crumble, the radiator must be replaced. Upgrade Notice: BMW coolant is specially formulated to prevent internal corrosion and the build-up of silicate compounds on both the radiator and the engine internal surfaces. The BMW coolant is available at Bavarian Autosport. We now also offer NPG+ waterless coolant. Please see the Product Focus on page 6 of this newsletter for more information on this rather amazing coolant.

**Possible Cause E:** An exception to the above is 6-cylinder engines on 3 series 92 on, Z3, Z4 and 5 series 91 on. The water pumps on these engines were made using plastic impellers (the part that actually pumps the coolant). There is now a long history of these impellers either slipping on the pump's drive shaft or actually breaking apart. The engine may act like it has a stuck thermostat, or it may idle OK but get hot if you try to drive it. The water pump must be replaced. Upgrade Notice: Bavarian Autosport has an upgraded water pump that uses a metal impeller instead of the failure-prone plastic one. This part will eliminate the broken impeller problem once and for all. (See page 7.)



Thermostat

## Common overheating issue #3:

*"My BMW overheats no matter what I do. I can start it cold, and the temp just continues to go up until it is in the red in a few minutes."*

With a couple exceptions, this would typically be a thermostat that is stuck closed and is not allowing the coolant to flow to the radiator.

**Possible Cause A:** Is the radiator still cool, even when the gauge is reading very hot? If so, the typical problem would be the closed thermostat. You'll have to replace the thermostat.

**Possible Cause B:** Refer to Possible Cause E above.

Continued on page 6



**Too hot** *continued from page 5*

**Possible Cause C:** Another exception can be a failed cylinder head gasket or cracked cylinder head. Things to look for would be:

- Excessive white smoke from the exhaust.
- The coolant has visual evidence of oily deposits in it and smells like oil or fuel.
- The engine oil has a tan or gray looking foam in it.

**Possible Cause D:** There may be air trapped in the cooling system, preventing the thermostat from opening or causing the water pump to cavitate. Either way, the coolant does not properly flow to the radiator in this case. However, this should not happen unless the system has been opened up due to the replacement of a part, such as; thermostat, hose, water pump, radiator, etc.

**Common overheating issue #4:**

*“My BMW doesn’t seem to be overheating initially, but it does keep losing coolant, which eventually causes an overheating situation.”*

**Possible Cause A:** This will typically be due to a leaking hose, gasket, water pump, radiator, heater core, head gasket or cracked cylinder head. Often the leak is small and does not leave a visible puddle under the car, nor does it create a cloud of steam under the hood or, in the case of a head gasket or cracked head, visible white smoke or oil foam. In this situation, you must perform a very thorough inspection of the whole system in order to identify the leak.

If you cannot identify a visual leak, the system can be tested with a pressure tester. This attaches in place of the system’s cap and pressurizes the system (while it is cold and not running), which will likely make a leak visible that may only happen under pressure. This is also the proper means to identify a small head gasket or head leak.

**Possible Cause B:** This can also be caused by a faulty system (radiator) cap. If the cap is weak and not capable of holding the specified pressure in the system, it will allow the expanded coolant to escape through the overflow tube. Additionally, the reduced pressure in the system will allow localized boiling of the coolant at the hottest parts of the engine. This will reduce the efficiency of the coolant and tend to create a “runaway” overheating situation.



Radiator Cap

The cap can be tested at your BMW repair shop on a pressurized tester, or it can just be replaced. Look at the rubber seal on the cap. If it is torn or looks suspect, replace the cap.

**Bleeding the cooling system:**

After opening the cooling system and replacing a faulty part (hose, gasket, water pump, radiator, etc.), the system must be bled of all internal air pockets. If not fully bled out, these air pockets will cause overheating due to cavitation at the water pump or a tendency for the thermostat to not open properly. Bleeding the cooling system can sometimes be tedious and frustrating (though other times it is quick and straight forward). Here are some pointers on performing the bleeding:

- It will help the bleeding process if you can raise the front of the car by placing it on ramps or jack-stands.
- Locate the bleeder screw. Some models (most through the late ‘80s) have the bleeder on the thermostat housing while others have the bleeder on the radiator side tank or the expansion tank (reservoir). Refer to photos above right.
- Set the heater controls to full warm settings and start the engine.
- Leave the bleeder screw open while the engine is running (with the reservoir cap closed). Bring the engine speed up to about 1500 rpm and give it a bit more

throttle intermittently. If the temp goes up past 3/4 on the gauge, shut it off and leave the bleeder open (assuming air and maybe a bit of coolant are coming out).

- When the steam and pressure stop coming out, carefully open the reservoir cap just to the point where the remaining pressure (if any) releases. If coolant comes out of the overflow tube or the cap, re-tighten it. If no coolant comes out, go ahead and open the reservoir and add fluid as required.



Typical early model BMW (3 series 84 thru 91 shown).

Typical late model BMW (3 series 92 thru 98 shown).

- Install the cap and start the engine again. Keep repeating this process until coolant is continuous at the bleeder and the engine temp stays constant.
- It can also help if you pull the plug on the thermostatic fan switch (on the side of the radiator) and jumper the power wire to the high-speed wire, to turn the fan on. This will help prevent the system from overheating just from revving the engine with no airflow over the radiator.
- Once you think you have the system fully bled, grab your tool for the bleeder screw and a jug of coolant and go for a short ride. If the temperature goes past the normal operating temperature on the gauge, stop and turn the engine off and open the screw; there will likely be more air. Proceed as outlined above; add coolant as required. This should take care of the final bleeding.

*Tip: doing the above while safely parked in an uphill position (as if the front of the vehicle were up on the ramps) can help eliminate trapped air.*

As always, if you have any questions about any of the procedures outlined in this article, don’t hesitate to e-mail Otto, or speak with one of our phone reps.

**NEW! Lifetime coolant!**

One of the biggest troublemakers in your BMW’s cooling system is water. It can be a cause of:

- water pump cavitation.
- localized hot spots, boil-overs and vapor pockets.
- internal corrosion due to the inherent minerals.
- oxidation of aluminum and metal.

NPG+ from Evans Cooling Systems is an innovative product that takes water out of the equation because it is used at full strength – you never mix it with water. It does not boil until 375° F, and it doesn’t freeze at -40° F like a 50/50 coolant. As a result, NPG+ eliminates a number of the problems outlined above. Plus, when installed in a properly drained and sealed system, it can remain stable for 500,000 miles – no more coolant changes! NPG+ has been used in racing for years. It is now available for BMWs at \$27.95 gallon.



## Cooling system upgrades from Bavarian Autosport.



**Aluminum thermostat housings** for 6-cylinder engines in 3 series 92 thru 98, Z3 thru 98, 5 series 91 thru 98. Replaces the crack-prone, plastic thermostat housing that came on your car.

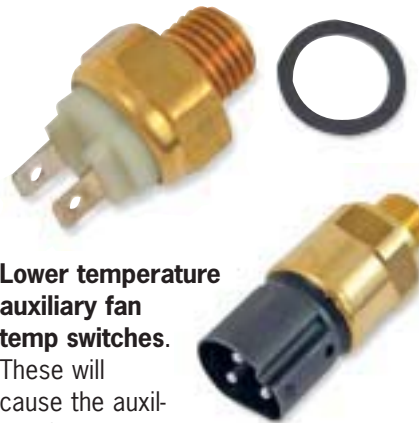


### Red Line Water Wetter.

This product is added to the cooling system and greatly increases the coolant's ability to absorb and release heat, thus increasing the cooling system's cooling capacity just as if you were to install a larger radiator.



**Metal impeller water pumps** for most 6-cylinder engines in 3 series 92 on, Z3, Z4, 5 series 91 thru 03. These better-built water pumps replace the original factory water pumps that have plastic impellers. The plastic impellers are known to crack and slip on the pump's drive shaft or to completely break apart, leading to potentially catastrophic failure.



### Lower temperature auxiliary fan temp switches.

These will cause the auxiliary fan to come on at a lower coolant temperature than the original switches. This can keep the cooling system from getting into a "runaway" overheating situation.

**Antifreeze.** BMW antifreeze/coolant is highly recommended for systems that



use a water & coolant mixture. The phosphate-free BMW antifreeze is specially formulated to combat the effects of corrosion and electrolysis within the iron or aluminum cylinder blocks

and aluminum cylinder heads. An even better upgrade is our new lifetime coolant, NPG+, which uses no water. For more information, see page 6...

*We sell everything for your BMW's cooling system - radiators, water pumps, hoses & clamps... everything!  
Call 800.535.2002 and tell your phone rep what you need, or shop online at [www.BavAuto.com](http://www.BavAuto.com)...*

## How easy is this?! do-it-yourself

### Bring out the bling: 3 steps to gorgeous alloy wheels. ↗



**1.** Most alloy wheels today feature a painted and/or a clear coat finish. Treat the finish of your wheels as you would the finish of your car. If the wheels are just slightly dirty, a simple washing will do. Remove loose dirt and brake dust with a reasonably high pressure hose. Spray the wheel with P21S Wheel

Cleaner. Use a soft bristle brush to get into corners and around spokes, lugs, etc. to loosen stubborn brake dust. Then rinse off the dirt.

*Tip: Clean your wheels one at a time so the soap/cleaner doesn't dry on one wheel while you're cleaning another, leaving spots or streaks.*

If the wheels are heavily soiled, have sap or tar on them or a reddish/yellowish tinge, apply P21S Wheel Cleaner gel and let it sit for an hour or so. The gel clings to the wheels and doesn't run off and down your driveway, plus it's perfectly safe.

*Tip: After all wheels have been cleaned, move your BMW forward or backward one-half of a wheel rotation, so the portion of the wheel that was at the top is now at the bottom. This will help you see dirt hiding in the corners or around the valve stems.*

**2.** Once your wheels are clean and dry, apply a coat of Wheel Wax. It's easy to do, will cut future cleaning time significantly and help your wheels look good for weeks

instead of days. (Note: If your wheels were heavily soiled before you started cleaning them, we recommend using a deep cleanser such as P21S Paintwork or Zymöl HD Cleanse – just as you would on your BMW's finish – before applying Wheel Wax.)

**3.** After your wheels have been cleaned and waxed, bring out their bling even more by darkening your tires. Our favorite tire black is Forever Black Tire Gel. It's easy to apply, easy to control where it goes (e.g. not messy like a spray), lasts longer than most other tire blacks and doesn't contain harmful silicone.



We've assembled most of the products mentioned above into a money-saving kit. It contains P21S Wheel Cleaner gel, a natural fiber wheel brush, Wheel Wax and Forever Black Tire Gel. Purchased separately these items would cost \$55.80. The kit is priced at \$49.95, a savings of \$5.85.

### Wheel cleaning no-nos:

- Never use abrasives or polishing compounds on alloy wheels.
- Never steam-clean wheels. Steam can ruin the clear coat finish on your wheels.
- Never clean wheels that are hot. Wait until they cool. Cleaning wheels while they are hot can cause soap/cleaners to leave spots or a film on your wheels.
- Use automatic car washes with caution. Some car washes use acid cleaners and/or harsh, stiff brushes. Both could harm your wheels' finish. Ask the car wash people before you drive in.