

## **AVOIDING EXPENSIVE BRAKE PROBLEMS**

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In recent months, I have started to see more anti-lock brake system related brake problems. For the past decade, this amazingly effective system has, for the most part, been trouble free. As a reminder to club members, I offer some basic brake suggestions to avoid trouble.

First and foremost is to regularly flush the brake fluid system. BMW recommends that brake fluid be changed every two years. Since the advent of ABS in 1985, BMW recommends that all models use Dot 4 brake fluid (such as Castrol GTLMA). This brake fluid, as is the case with all Dot 4 brake fluid brands, is hygroscopic, meaning that it readily absorbs moisture when exposed to air. Moisture lowers the boiling point of the fluid and can cause brake fade.

It has been estimated that in Houston, two year old brake fluid will contain anywhere from 4 to 8% water. This small amount will lower the boiling point by more than 25 to 30% which could cause compromised stopping power when it is needed most. In addition, moisture in the system can cause corrosion in the bores of system components, eventually leading to premature seal wear (i.e. leaking calipers, master cylinders, etc). Most of the ABS related failures that I have encountered can be traced to moisture contamination which leads to corrosion that can make the ABS valves stick. This usually requires expensive repairs that could have been avoided by periodic flushing.

Houston has more moisture in the atmosphere than do most places in the country. Because of this, I recommend brake fluid be tested for moisture content at least once a year. Flushing may be wise to do on a yearly basis, especially if the car is exposed to severe driving conditions (i.e. constant freeway stop and go, or racing/ auto-crossing). In fact, if a car is to be used at the track at all, I recommend the use of ATE Super Blue, which is still a Dot 4 fluid but has a higher boiling point than normal Dot 4 fluid.

While we are on the subject of alternative brake fluids, I still receive many questions regarding the use of silicone brake fluid. Anti-lock brake systems which are of the integral type that pumps fluid under high pressure (such as all BMW's) should not use silicone brake fluid. Silicone fluid does not provide the correct amount of lubrication for the essential working parts of a master cylinder, calipers, or wheel cylinders. In addition, silicone fluid has a tendency to aerate when put in a pressurized situation. Any air bubbles in the brake lines will cause the pedal to sink drastically. Silicone fluid also repels moisture. Because many ABS controls and valves are made of stainless steel, attraction toward other ABS components made of steel happens at an accelerated rate. This could cause sticking or failure of the ABS unit.

While regular flushes are important, proper flushing is crucial. On an ABS equipped car, this requires cycling the ABS unit during flushing. The ABS pump holds fluid that will not be flushed unless the pump is run. Another way to insure an effective flush on all brake systems is to clean out the brake fluid reservoir. This should be done during every flush by removing the reservoir from the master cylinder for clean out with brake cleaner. You will notice a film of residue that has settled on the bottom of the reservoir; if this is not cleaned out you will simply flush this contaminate into the system.

My final recommendation is something that is often overlooked by both novice and expert alike. When working on brakes for any reason, do not force the caliper pistons back into the caliper without first releasing the caliper bleeder screw. Not following this simple step is inviting certain disaster and can have a dramatically negative effect on the longevity of the brake system. The calipers are located at the lowest point of the hydraulic system and tend to collect particles released from suspension in the fluid. Compressing the pistons forces this contamination back through the system causing other component failures. Always open the bleeder screw allowing contaminated fluid to escape before pushing the piston inward. Remember, it is better to strip a bleeder screw than to contaminate the ABS unit!