



AMSOIL Brake Fluids

Series 500 DOT 3 High-Performance (BF3)

Series 600 DOT 4 Racing (BF4)

AMSOIL Series 500 DOT 3 High-Performance Brake Fluid and AMSOIL Series 600 DOT 4 Racing Brake Fluid provide superior high-temperature performance in auto/light truck, high-performance, racing and powersports applications.

Brake Fluid Failure

There are two basic failure modes for brake fluid: It can boil, and it can cease to provide adequate lubrication and corrosion protection. Both are the result of contamination, usually with water or petroleum products. DOT 3 and DOT 4 glycol brake fluids are hygroscopic, they absorb water easily and hold it in suspension, much like antifreeze. The second the cap is removed from a bottle of brake fluid, the brake fluid begins absorbing water from the air. And while brake fluid is kept in a closed system, moisture seeps into the brake system continuously through the various seals and microscopic pores of the flexible brake lines. Moisture absorption through the brake system accelerates as vehicles age, and there's almost no limit to how much water brake fluid can absorb. Water lowers the boiling point of brake fluid, which will eventually lead to failure. After two years of service, the average boiling point of brake fluid will have dropped below the minimum federal requirements.

High Boiling Points Prevent Failure

As the brake system heats up, brake fluids with low boiling points begin to vaporize. The brake pedal must travel further to apply the same amount of force on the brakes, causing a spongy feeling. If enough of the brake fluid is vaporized, brake system failure may occur.



Brake fluid boiling points are measured on two separate scales:

- Dry equilibrium reflux boiling point (ERBP) - the boiling point of new, freshly-opened unused fluid
- Wet ERBP - the boiling point of a brake fluid after it has absorbed three percent water.

The Department of Transportation (DOT) has set minimum standard requirements to ensure brake fluids will provide adequate protection. The minimum dry ERBP for DOT 3 brake fluid is no less than 205°C (401°F), the minimum wet ERBP is 140°C (284°F). It only takes four percent water contamination to bring a DOT 3 fluid's boiling point down to the federal limit.

The minimum dry ERBP for DOT 4 brake fluid is 230°C (446°F), the minimum wet ERBP is 155°C (311°F). Their higher boiling points make DOT 4 fluids appropriate for high-performance cars and motorcycles, and for vehicles used for towing. Because brake fluids are hygroscopic, the wet boiling point is of much greater concern than the dry boiling point.

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AMSOIL Brake Fluids exceed government standards. They feature high wet boiling points for maximum life, superior performance and reliable braking, even in extreme conditions. AMSOIL Series 500 DOT 3 High-Performance and AMSOIL Series 600 DOT 4 Racing Brake Fluids maintain a stable viscosity over a wide temperature range and flow easily at the highest pressures generated in automotive brake systems. AMSOIL Brake Fluids provide good lubrication throughout the system and their superior additive package can raise boiling points to more than 232°C (450°F). They keep water in suspension, slowing its effects on the brake system. Consult the AMSOIL Online Product Applications Guide at www.amsoil.com for application information. For powersports applications, consult the owner's manual to determine the correct DOT classification.

Typical Technical Properties

AMSOIL Series 500 DOT 3 High-Performance Brake Fluid and AMSOIL Series 600 DOT 4 Racing Brake Fluid

Series 500 DOT 3 High-Performance Series 600 DOT 4 Racing

Equilibrium Reflux Boiling Point		
Dry °C (°F)	274 (525)	304 (580)
Wet °C (°F)	156 (313)	210 (410)
Viscosity		
-40°C (-40°F), cSt	1065	1550
100°C (212°F), cSt	2.0	2.0
pH	9.0	7.2

Brake Fluid Requires Regular Maintenance

Gradual Change

Most drivers don't notice when brake pads are worn to their limit. As brake pads wear, pedal-travel doesn't change much, and modern drum brakes have self-adjusters. This allows brakes to feel normal and continue to stop the vehicle effectively, even though they are in need of maintenance.

Symptoms of Contamination

Hydraulic fluid in a brake system feels like a solid mechanical part, a mechanical link between the master cylinder and the slave cylinder. When the brake pedal is pushed to the floor, the driver feels the resistance all the way at the other end of the line as the pads squeeze the rotor. If the rotor is warped, the driver feels the pads pushing back as the rotor's high spot moves between them. When brake fluid is contaminated, the pedal feels spongy, like there are rubber bushings on the rod ends.

Contamination Leads to Failure

There are only two things that change the way hydraulic fluid behaves in a brake system: leakage or fluid contamination. A leak is fairly obvious to any driver, regardless of experience. Contamination, however, can cause some unusual problems that aren't always easy to diagnose. Virtually all brake systems suffer fluid contamination at some point, so it is necessary to routinely perform proper brake fluid maintenance. Refer to the front of this data sheet for more information regarding brake fluid contamination and failure.

Contamination Affects Compressibility

Fluid pressure in brake systems is multiplied by the master cylinder and can reach more than 1,000 psi in the brake lines. As the pressure builds, the various cups and seals in the system are shaped so they expand slightly, increasing their pressure against the bores to form a seal. Like any other hydraulic fluid, brake fluid must be non-compressible at the expected pressures to transmit force from one end of the system to the other. It also must lubricate the pistons and rubber parts as they move through their bores. Unlike other hydraulic fluids, however, brake fluid does not flow throughout the system. Brake fluid simply moves slightly back and forth for most of its life, leaving no opportunity to circulate through a heat exchanger or filter. Because it can't be filtered, brake fluid must hold contaminants in suspension to prevent corrosion and clogging of small passages.

Action Needed

Many European countries require regular brake fluid inspections; half of all cars fail. Half of all cars and light trucks in the United States that are 10 or more years old have never had their brake fluid changed. After only a year of service, brake fluid in the average vehicle may contain as much as two percent water; up to three percent after 18 months. After several years of service, it is not unusual to find brake fluid contaminated by seven to eight percent water.

Brake fluid is vital to safe driving, yet one of the most neglected fluids in vehicles today. Experts recommend changing brake fluid every 12 to 24 months as preventative maintenance, even more often in wet and extremely humid climates.

AMSOIL products and Dealership information are available from your local AMSOIL Dealer.

