

Tips for the workshop ...

... from the ATE Training Center

Did you know that the boiling point of brake fluid contaminated with water may be as low as 100° C, leading to bubbling and even to failure of the brake system?

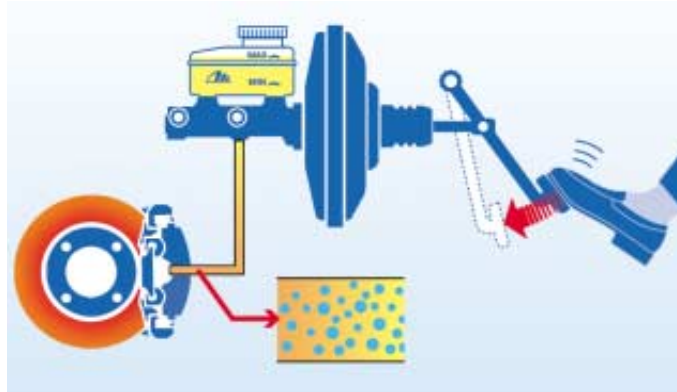
Brake fluid is the lifeblood of a brake system. As it performs its tasks behind the scenes, it is often forgotten during servicing. Drivers are not aware of the crucial role played by their brake fluid. They should know that 70 per cent of all vehicles have dangerously old brake fluid and that their vehicle may be affected too.

Why is brake fluid so important?

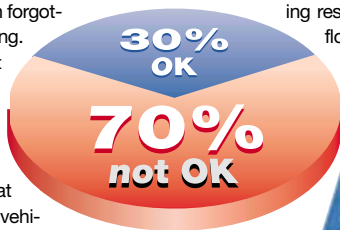
The force applied by the driver to the brake pedal is transmitted to the brakes hydraulically, by the brake fluid. During braking, the brakes are heated to temperatures as high as 800° C. These high temperatures, which arise as a result of friction between the brake pad and disc, are transmitted via the pads and pistons in the caliper to the brake fluid, which is also heated up as a result.

What is the problem?

If water is present in the brake fluid, its boiling point may be reduced towards



100°C. If brake fluid boils, bubbles form in the brake system. These bubbles consist of vapour, in other words gas, and gas can be compressed. The devastating result is that the driver can floor the brake pedal without meeting with any resistance, or indeed any braking effect.



This is the danger!

Brake system failures have already caused countless accidents. After the accident, it was often impossible to find the cause in the workshop because the brakes functioned perfectly well as long as the brake fluid was cold.

The brake fluid should be tested at least once per year!

This is why ATE recommends a brake fluid test using ATE brake fluid tester BFCS 300, which measures the boiling point of the fluid, for all vehicles at least once per year. We want your customers to be safe

The intervals for brake fluid changes depend on the vehicle model and its age. As a rule of thumb, intervals can be based on the following guidelines:

Age in years	Fluid change interval in years
less than 3	3
between 3 and 10	2
older than 10	1

For rally and racing cars, we recommend **ATE Super Blue Racing brake fluid**. Vehicle owners can find more detailed information in their driver's manual.



	G (DOT3)	SL	Super DOT4	TYP 200
Boiling point:	at least 245°C	at least 260°C	at least 260°C	at least 280°C
Wet boiling point:	at least 150	165°C	at least 180°C	200°C
Replacement interval:	1 year	1 year	up to 2 years	up to 3 years

and sure. We are often asked: "My garage tests the moisture content of the brake fluid. Is that OK." Our clear answer is: "The results of this test do not say much about the actual condition of the brake fluid. There may be a difference of up to 70°C between the measurement and the actual boiling point of your brake fluid. We can only warn against the use of testers of this type."

Corrosion in the brake system?

Water in a brake system corrodes the brakes themselves and the tandem master cylinder from the inside. Rust may destroy seals in the system, resulting in brake failure and costly repairs. When should the brake fluid be changed?

What brake fluid should we use for vehicles with ABS, ATC and ESP?

For modern vehicles with brake control systems such as ABS and ESP, only the best is good enough. Only **ATE Super DOT 4 or DOT 4 Type 200 brake fluid** should be used.

Always comply strictly with the specified fluid change intervals. Some of the nozzles and channels in a brake system are tiny, with diameters as thin as a human hair. Old brake fluid containing foreign matter and water can easily clog up these vital systems, Old brake fluid and ABS: Old brake fluid, contaminated with foreign matter and water, can no longer flow through the tiny openings in the ABS

What do we mean by...

... DOT?

DOT is the US Department of Transportation. As regards brakes, vehicle and brake manufacturers work in accordance with DOT standards.

... boiling point?

The boiling point is the temperature at which a new brake fluid boils when heated. The boiling point is indicated on each can of brake fluid.

... wet boiling point?

DOT standards require the wet boiling point of new brake fluid to be measured with a water content of 3.2 %. This is only a laboratory test value which has nothing to do with the actual boiling point of the fluid. However, the higher the wet boiling point, the higher the quality of the brake fluid.

... actual boiling point?

The actual boiling point is the boiling point measured during workshop testing.

unit, as thin as a human hair.

What brake fluid does ATE recommend? For cars

older than 10 years:	ATE Dot 4SL
older than 3 years:	ATE Super Dot4
less than 3 years old:	ATE Dot4 Type 200

An ATE safety tip:

Check the brake fluid at least once per year. Better still, change it every 1 to 2 years. Inspect the brake system at the same time.

The ATE check list for correct brake disc installation

You should use this check list during brake disc installation to make sure that you have taken all the important points into account and to avoid later complaints from the customer.

The ATE recommendation:

As a confidence-building measure, why not place a copy of the completed check list in the customer's vehicle?

The ATE tip:

Before you replace the brake discs or pads, drive the vehicle to see whether the brakes judder. This will help you to counter later criticisms by the customer.

Important note:

If the brake discs are dismantled with considerable force, the ABS lamp on some vehicles may light up, indicating that one of the sensors has been destroyed by hammer blows.

The ATE check list:



- Play on wheel bearing checked?
- Wheel bearing adjusted? (if still possible)



- Wheel hub thoroughly cleaned? The hub must be cleaned to bright metal!
- Wheel hub measured? max. side runout allowed 0.020 mm (guideline), better near to zero!
- Wheel hub checked using straight-edge?
- Hub sprayed with oil?
- Never use copper paste!
- Wheel bolts tightened using torque wrench?

- Correct torque applied? If the torque used is too high, the wheel hub may be warped!



- ATE brake disc friction ring contact surface on hub cleaned and degreased? ATE PowerDiscs (brake discs with grooves) do not need to be degreased if there is a red slip in the package!
- Brake disc measured? Max. side runout when installed 0.060 to 0.090 mm (guideline)! For measurement, fix the disc in place with four bolts or nuts!



- Free running of caliper, sliding elements and piston checked?

- Sliding elements or piston replaced if necessary?
- Caliper channel and holder cleaned?

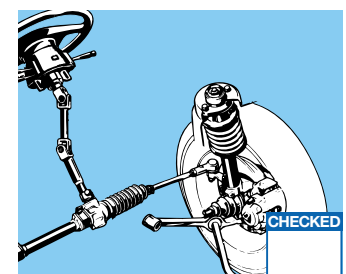


- ATE plastilube® applied to sliding surfaces of brake pads, e.g. hammer head?

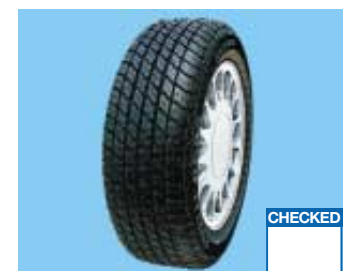


- Rubber elements and rubber/metal connections of front axle checked?
- Or replaced by harder parts? Recommended for some vehicles

from 80,000 km! See manufacturer's recommendations!



- Tie rod ends and steering dampers inspected for wear?



- Tires inspected for any bulges (damage)?
- Tire balanced on vehicle, radial and side runout checked?

WARNING!

Run brake pads in as gently as possible. Avoid hard braking during the first 200 km.