



TECHNICAL BULLETIN

September 2014

BRAKE FLUID EXPLAINED - PART I



In this technical bulletin we look at brake fluids and explain some of the differences. The first thing to understand is what is the dry boiling point and what is the wet boiling point.

Brake fluids are hygroscopic meaning they absorb water over time. The dry boiling point means the fluid has absorbed no water. The wet boiling point means the fluid has absorbed water and is wet. As the brake fluid absorbs more water over time the boiling point will continue to decrease, which lowers the performance of the brake fluid.

DIFFERENT BOILING POINTS

Dot 3, Dot 4, Super Dot4 and Dot 5.1 brake fluids all have different boiling points. Below are the minimum specifications. The wet boiling point is defined as 3.7% water by volume.

Fluid	Dry Boiling Point	Wet Boiling Point	Primary Constituent
Dot 3	205 C (401 F)	140 C (284 F)	Glycol Ether
Dot 4	230 C (446 F)	155 C (311 F)	Glycol Ether / Borate Ester
Super Dot 4	260 C (500 F)	180 C (356 F)	Glycol Ether / Borate Ester
Dot 5.1	270 C (518 F)	190 C (374 F)	Glycol Ether / Borate Ester

Note – Dot 3 brake fluids will absorb water faster than Dot 4, Super Dot 4 and Dot 5.1 meaning they won't last as long. This is because Dot 4, Super Dot 4 and Dot 5.1 contain more borate esters, which can bind water and better maintain their boiling point.

It is generally accepted that the higher the boiling points the better the fluid and in most cases that is the case. Higher boiling points mean higher performance. It is worth remembering however that different manufacturers have different formulations, and other tests that affect the performance of the fluid can come into play, for example the effect of the fluid on rubber. For this reason it is important to use only what the vehicle builder recommends.

WHY ARE SOME VEHICLE MANUFACTURERS RECOMMENDING ONLY DOT 3 BRAKE FLUID?



As we can see in the above specification Dot 3 brake fluids have the lowest boiling points and absorb the most water over time, so why do some manufacturers insist on using it?

The reason is that specifications allow a certain degree of variation in regards to the rubber testing (swelling of the cup). For example with Dot 4 and Super Dot 4 brake fluids a 1% to 16% swelling of the rubber cup is allowed. Therefore a brake fluid could be made that has a 15% swell and it would still be within the required specification. However this is vastly different to a brake fluid that has, for example, a 4% swell that is also within specification.

As some manufacturers have had bad experiences with these brake fluids in the past and can't tell which of them have acceptable swell tests and which ones don't, they have chosen to recommend only traditional Dot 3 brake fluids which they have previously used without problems.

There are many good quality Dot 4 and Super Dot 4 Brake fluids that have swell tests that are quite low, and hence would be perfectly fine to use and would also outperform the Dot 3 fluids. However as previously advised if the manufacturer insists on Dot 3 brake fluid only then you really have little choice but to follow the manufacturer's requirements.

CAN YOU HELP ME CHOOSE THE BEST FLUID?

Onshore Oils stock a large range of high quality brake fluids including Total, Elf and Tru Grit and have all the above specifications covered. Our sales consultants have a long history in the motor industry and are more than happy to visit your premises to assess your requirements. Please contact us on the details below to make an appointment.

Thanks and stay tuned for a special offer.

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