



TECHNICAL BULLETIN

Brake Fluid Testers

Issue: November 2014

BOILING POINT TESTING:

All passenger car, motorcycle & light duty commercial vehicle service centres should be aware that boiling point is the **ONLY** method approved to test brake fluid. No other method is approved or recognised as a viable test of a brake fluids boiling point.

Conductivity meters are not considered appropriate or approved for brake fluid testing - or checking. Even if it's supplied to you by a reputable dealer with a reputable brand on it, conductivity meters are not approved by the brake or vehicle manufacturers.

Background

Dot 3, Dot 4 & DOT 5.1 brake fluids have different boiling points. These minimal specifications are as follow:

Fluid	Dry Boiling Point	Wet Boiling Point
Dot 3	205° C (401° F)	140° C (284° F)
Dot 4	230° C (446° F)	155° C (311° F)
Super Dot 4	260° C (500° F)	180° C (356° F)
Dot 5.1	270° C (518° F)	190° C (374° F)

DOT 4 & Super DOT 4 brake fluids have a greater borate ester content than **DOT 3** fluids and therefore higher wet boiling point. Because of this, they can absorb more water over time. Borate esters can bind water and still retain the boiling point. (*Some formulations will do this better than others.*)

To test a brake fluid's conductivity, it's water content must be measured and determined by the brake fluids boiling point. Brake fluid boiling point changes brand to brand, product type to product type so can vary considerably between brake fluids. Some points to consider –

- Conductivity will rise as water content rises
- Starting point in conductivity and rate of rise can vary greatly between formulations
- If a tester is calibrated for one fluid it is likely to give **inaccurate** results on others. (*Problem here is that it is highly unlikely that workshops are calibrating or are even able to calibrate a tester, especially one based on conductivity*)

Measuring the Boiling Point

Brake fluid testers that are used to determine water content should heat the brake fluid and not rely on conductivity. Vehicle service centres should use a tester that heats the brake fluid to determine the correct boiling point. This is the only accurate way to test a brake fluids performance. Testers that do measure the boiling point, still require regular maintenance such as calibrating. Several tester brands base a fluids suitability for continued use at a minimum of 180° C. Below this temperature they advise changing the fluid. Above this temperature it is considered suitable for continued use.

Conductivity Testers

Most of the testers used are “conductivity testers” and according to the brake fluid developers and manufacturers – They don't work.

Conductivity testers estimate water, relying on conductivity measurement to be converted to a theoretical wet boiling point and then to a water content manifesting itself into a green, yellow or red light. Problem is conductivity of new brake fluid varies for different DOT fluids and further, from formulation to formulation within a DOT grade.

This raises the question of - *What are these conductivity testers “calibrated” against or to?*

Once again, a tester should be calibrated to a manufacturer's product if it is to be used to measure that products effectiveness.

Calibration is key to accuracy for all testers.



Conductivity type tester



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New Fluid Readings v's Used Fluid Readings

All DOT grades of brake fluid (apart from Dot 5 Silicone) will absorb moisture as they are Hygroscopic. Dot 3 fluids will absorb water faster than Dot 4, Super Dot 4 or 5.1 fluids and their lifespan is generally shorter. If brake fluid is tested with a conductivity meter at certain intervals, it may show an increase in water absorption over new fluid but as we have stated, if it is not exactly calibrated to the brake fluid that it is testing, then the reading cannot be considered accurate. Again, the conductivity test does not give an accurate reading of the brake fluids boiling point. If measuring fluid during a life cycle, then it should be done in an approved way that is recognised as an international standard.

International SAE standards specify a test procedure for determining a brake fluids boiling point. – SAE J291_201304. This should be used to determine a fluids suitability for continued use.

These type of testers that boil the fluid are more accurate than conductivity testers.



Further details on these products are available on their respective product information sheets found on the Penrite web site: www.penriteoil.com.au/products

Penrite recommend “The Right Oil for the Right Application”

[Click Here](#) to visit the Penrite Recommendation Guide, which will ensure you receive the correct oil for your application



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