

# TECHNICAL TIPS

## N°4: LOSS OF BRAKING EFFICIENCY

### VAPOUR LOCK N°1



#### ▼ LOSS OF BRAKING EFFICIENCY HAS MANY FACES

Drivers can experience loss of braking efficiency in many different ways: overheating, brake fade, and brake pad degradation are but a few. Vapour lock is one of the most frightening and most dangerous of all. This leaflet explains the problem, and offers some ways to prevent this from happening.

#### ▼ WHAT IS BRAKE FLUID?

To understand vapour lock it is necessary to understand the function of brake fluid. Brake fluid – a mixture of synthetic organic chemicals – transmits hydraulic pressure from the brake pedal through hydraulic lines to the braking mechanism near the wheels. To make this possible, brake fluid must be incompressible. Because of the safety critical role of brake fluid, it is essential to manage the quality and specification of the fluid.

#### ▼ HOW IS BRAKE FLUID RELATED TO VAPOUR LOCK?

Braking generates considerable heat. To resist these high temperatures without boiling, brake fluid is designed with a high boiling point. But brake fluid is also hygroscopic, which means it absorbs water. In any hydraulic brake system, the brake fluid gradually absorbs moisture from the air through the flexible brake hoses or the reservoir breather. This moisture reduces the brake fluid's boiling point.

Once this moisture absorption reaches a certain level – under prolonged, hard braking, especially in hot weather or when the vehicle is heavily loaded – the generated heat can cause the brake fluid to start to boil, creating gas bubbles. As gas is far more compressible than liquid, the driver will experience no pressure at all on the brake pedal, resulting in a complete loss of brake power. This is known as vapour lock.



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# VAPOUR LOCK N°1

### HOW TO AVOID VAPOUR LOCK

#### 1. CHOOSE THE RIGHT BRAKE FLUID:






The brake fluid you choose to put in the hydraulic system is critical. Vehicle manufacturers always recommend a specific type of fluid; this should always be adhered to. Of course, the quality of the brake fluid is key.

#### A GOOD FLUID SHOULD

- be incompressible to give solid pedal during braking
- have a high boiling point
- maintain performance during absorption of moisture
- have a viscosity that remains within closely defined parameters
- have the correct level of lubricity
- prevent corrosion
- have a controlled rubber swell to prevent shrinkage

In addition, it is essential to check the dry and wet boiling points of the brake fluid to ensure it meets minimum legal specifications. Ferodo brake fluids exceed legal requirements across the whole range.

#### FERODO FLUIDS

	DRY BOILING POINT*		WET BOILING POINT**	
	Legal requirement	FERODO	Legal requirement	FERODO
 DOT 4 Synthetic	230	249	155	158
 DOT 5.1 Synthetic	260	269	180	183
 ESP DOT 4 Synthetic – Electronic Stability Program	260	270	165	170
 LHM Mineral Citroën Hydraulic System	240	250	NOT APPLICABLE (NON-HYGROSCOPIC BRAKE FLUID)	
 DOT 5.1 EHV Brake Fluid	260	274	180	184

\*Dry Boiling Point is measured when the fluid is new

\*\*Wet Boiling Point is measured after the fluid has been subjected to a specific moisture level for a specific time

#### 2. TEST THE BRAKE FLUID:

Test the brake fluid regularly to determine the actual boiling point.

#### 3. CHANGE THE BRAKE FLUID:

Change the brake fluid when the boiling point is too low.

**NOTE:** Please see our next Technical tips leaflet Vapour Lock N°2 for more detail on these topics.

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