Brake fluid | HELLA

Task

Brake systems are complex entities in which many elements must work together perfectly to ensure safe functioning, even in extreme situations. The brake fluid plays a very important role in this, as it transfers the power from the pedals to the brake system by means of hydraulic pressure.

In order for it to fulfill its function, the effectiveness of the brake fluid must never be impeded under any circumstances. This means that the brake fluid needs to be resistant to low temperatures in order to ensure that it does not become viscous, or even freeze. It must never boil at high temperatures, as the resulting vapor bubbles could impair the performance of the brakes. Other important properties of brake fluid include corrosion protection, lubrication and good compatibility with the various materials used in the brake system. Brake fluid must function perfectly and be present in sufficient quantities at all times in order to guarantee that the vehicle functions reliably and remains safe on the road.

Boiling point and viscosity

Brake fluid (DOT 3, DOT 4, DOT 4LV,DOT 5,1) is based on a polyglycol bond, and is hygroscopic. This means that it absorbs humidity from its surroundings, usually by means of diffusion via the brake hose or the expansion tank. The older the components, the higher the permeability. If the water content in the brake fluid is too high, the boiling point will drop. As such, the dry boiling point, wet boiling point and viscosity of a brake fluid are crucial.

Dry boiling point:

The dry boiling point is the boiling point of new brake fluid from a sealed container, with no water content.

Wet boiling point:

The term "wet boiling point" refers to the boiling point of a brake fluid with a water content of 3.5% (by weight) under certain conditions.

Viscosity:

The viscosity is a measure of how easily a fluid flows. The higher the viscosity, the thicker (more slow-flowing) a fluid is; the lower the viscosity, the thinner (more fast-flowing) it is.

The viscosity of most substances reduces as their temperature is increased. Viscosity is particularly important in brake fluids designed for modern vehicles with ESP and ABS (DOT 4 LV and DOT 5.1), as they must be able to flow relatively quickly even at low temperatures.

Classification in accordance with DOT

In order to ensure that brake fluids fulfill the safety requirements for these criteria, certain minimum standards have been defined. In order to ensure that these are observed, the United States Department of Transportation has created the DOT classification, which must be observed by manufacturers.

DOT classification	DOT 3	DOT 4	DOT 4 LV	DOT 5.1
Dry boiling point	>205(229)	>230(268)	>230(267)	>260(269)
Wet boiling point	>140(149)	>155(163)	>155(172)	>180(187)
Viscosity at100°C [mm²/s]	< 1.5(1.95)	< 1.5(2.34)	< 1.5(2,1)	< 1.5(2.16)
Viscosity at-40°C [mm²/s]	<1500(1200)	<1800(1315)	<1800(675)	<900(810)

(In brackets: test results for HELLA brake fluid)

Maintenance information

HELLA recommends the following maintenance intervals in order to guarantee optimum brake performance and maximum safety:

- DOT 3: every 12 months
- DOT 4, DOT 4 LV, DOT 5.1: every 24 months

Only use the brake fluids specified in the service manual or on the cover of the expansion tank of the vehicle in question.

In addition to this, the brake system – and the brake hoses in particular – should be checked for leaks regularly during service inspections.

Product range and containers

HELLA brake fluid is available in the following containers:

Type	Article number	Container/liters
DOT 3	8DF 355 360-071	1.00
DOT 4	8DF 355 360-001	0.25
DOT 4	8DF 355 360-011	0.50

DOT 4	8DF 355 360-021	1.00
DOT 4	8DF 355 360-031	5.00
DOT 4	8DF 355 360-041	20.00
DOT 4 LV	8DF 355 360-051	1.00
DOT 4 LV	8DF 355 360-061	5.00
DOT 5.1	8DF 355 360-081	0.50
DOT 5.1	8DF 355 360-091	1.00

Important safety note

Technical information and practical tips have been compiled by HELLA in order to provide professional support to vehicle workshops in their day-to-day work. The information provided on this website is intended for use by suitably qualified personnel only.

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