

## Brake fluid DOT 4

### Questions:

#### Brake fluid compatibility

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- Can DOT 3 and DOT 4 brake fluids be mixed?
- Are DOT 5 silicone-based brake fluids miscible with other types?
- What are the problems and risks of mixing two different types of brake fluid?
- What is the situation with mineral and synthetic liquids? Are they compatible?

#### THE INTERNATIONAL STANDARD REQUIREMENTS

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##### The National Highway Traffic Safety Administration (NHTSA)

- Nhtsa's Department of Transportation (DOT) issued the FMVSS 116 standard that established operating requirements for automotive brake fluids. The FMVSS 116 includes three types of hydraulic brake fluid, based on their viscometric and boiling point properties:

Test	DOT 4
Dry Equilibrium reflux boiling point (°C)	230 min
Wet equilibrium reflux boiling point (°C)	155 min

##### SAE J 1703 en ISO 4925

- SAE J 1703 and ISO 4925 are the other two international standards for non-oil-based hydraulic fluids. These also provide the minimum operating requirements for car brake fluids. One of the requirements in these specifications is that all commercially available brake fluids must be compatible with each other. No Sludge formation or separation should occur when mixed.
- This test - known as the compatibility test - is also included in the FMVSS 116 standard.
- As a result, all correctly formulated brake fluids that comply with ISO 4925 SAE J 1703 and FMVSS 116 specifications are fully compatible with each other.

#### CAN DIFFERENT BRAKE FLUIDS BE MIXED?

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##### Effects on elastomers

- As part of the SAE J 1703, ISO 4925, and FMVSS 116 standards, all brake fluids must be tested and thoroughly assessed for their compatibility with the various elastomers present in the braking systems: SBR, EPDM, and natural rubber.
- DOT 3, DOT 4, and DOT 5.1 brake fluids are formulated and compatible with these elastomers. As a result, mixing different types of brake fluid will not cause damage to rubber seals, cups, or hoses of the braking system.

### Bring it up to standard (topping-up)

- Since DOT 3, DOT 4, and DOT 5.1 NSBBF are compatible, they can be mixed and used in the braking system without distinction.
- The leveling of the brake fluid reservoir, during operation, with any brake fluid selected from the DOT 3, DOT 4, and DOT 5.1 NSBBF, which comply with the International Standards, is, therefore, possible and will not cause damage to the braking system of the car.
- It is recommended, before bringing the reservoir up to level, to consult the manufacturer's instruction book and strictly follow the recommendations contained therein.

### QUESTIONS AND ANSWERS

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#### Can a synthetic brake fluid be mixed with another type of brake fluid?

- A brake fluid that complies with the FMVSS 116 (DOT 3, DOT 4 or DOT 5.1), ISO 4925, and SAE J 1703 specifications can be mixed very well with another brake fluid (except the previously mentioned DOT 5 on a silicone basis) since a miscibility clause has been included in the International standard.

#### Will mixing two different types of brake fluids affect the performance of the first fluid?

- Yes, if a synthetic brake fluid with a high boiling point is mixed with another brake fluid with a low boiling point, the performance and properties of the first fluid will be adversely affected.
- Nevertheless, it is possible to mix brake fluids of different specifications, which will not lead to any deterioration of the braking system components.
- However, it is recommended to use brake fluid to refute the braking system, which meets the exact specifications of the original liquid.

#### Can synthetic brake fluids be mixed with mineral oil-based liquids?

- No! Synthetic brake fluids of type DOT 3, DOT 4, and DOT 5.1 should never, under any circumstances, be mixed with mineral oil, petroleum-based liquids, or automatic gearbox fluids (ATF).
- These two liquid families are not at all miscible with each other. The properties of these fluids are different, and apart from not being miscible, it will lead to the overall deterioration of the braking system components.
- To prevent the risk of mixing the non-miscible products, the FMVSS 116 standard regulations stipulate that these liquids must have different colors.
- Not mineral oil-based, synthetic brake fluids: colorless to amber.
- Mineral oil-based: green.

## Conclusions

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- Any good quality DOT 3, DOT 4, and DOT 5.1 non-silicone-based brake fluids can be mixed at any time, without any adverse influences on the braking system components.
- DOT 5 silicone base brake fluids (purple red colored) are not miscible with other types and will not be mixed under any circumstances.
- Mineral oil-based hydraulic fluids and ATF are not miscible with synthetic brake fluids DOT 3, DOT 4, and DOT 5.1 and, therefore, cannot be mixed.
- Brake fluids are products that have to do with safety. Only products produced by reputable chemical companies can certify them and offer a guarantee. It is advisable to carefully read the instructions and information on the brake fluid packaging and ensure that the product is fully miscible with the brake fluid in the car's brake system.

## Disclaimer

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From information from GM regarding the use of DOT 3, among others, their position appears to be unchanged, "Only use DOT 3 in OPEL / 'ISUZU.'" At Renault, it seems that only in the Safrane a DOT 3 has to be used in contrast to the other types, for which a DOT 4 is prescribed. The same rule still applies to several Japanese, namely DOT 3!

Test	Min	Max	Results	Unit
Density at 20/20°C			1.066	
Reflux Boiling Point	260		262	°C
Water delen, KF		0.2000	0.0700	%(m)
Viscosity at -40°C		1500	1404	mm <sup>2</sup> /s
pH value 50% vol	7.0	11,5	7.9	
Wet boiling point	160		167	°C

### DOT 4

**Article number** 53502  
**Content** 250 ml

**Article number** 53551  
**Content** 1 liter

**Article number** 53555  
**Content** 5 liter

**Article number** 53586  
**Content** 60 liter