

Note: These specifications apply to the Mercedes-Benz, Maybach, AMG, smart brands.

WARNING

Antifreeze with corrosion inhibitor, or coolants, must fulfill Mercedes-Benz specific tests, which are as important as those of a component (e.g. guarantee heat transfer, antifreeze protection, increase boiling point, suppress foam effectively, ensure long-term corrosion and cavitation protection for all component parts of the cooling system). Products that are not listed in the following Specifications for Operating Fluids sheets do not have MB approval and can thus lead to **significant restrictions** in the engine output and/or to **irreparable damage** to the engine cooling system.

1. Terms used

Antifreeze with corrosion inhibitor:

Also known as "concentrate". Must be mixed with water as per Chapter 3.

Coolant:

Mixture of concentrate (or antifreeze) and water for cooling engines.

MB approval:

Identification of coolant and corrosion/antifreeze that are approved for use in vehicles/major assemblies of the Mercedes-Benz brand. The application area must be complied with in accordance with Specifications for Operating Fluids sheet 320.1. On the containers for tested products, you can find the term "**MB-Freigabe XXX.X**" or "**MB-Approval XXX.X**" as a note.

2. Overview and Specifications for Operating Fluids Sheets

For an overview of the approved Specifications for Operating Fluids sheets for cars and vans, see Specifications for Operating Fluids sheet 320.1.

The following information must be observed:

Products from different Specifications for Operating Fluids sheets are not compatible or miscible or only to a limited extent (see Table 3). Mixing products that can be mixed but have different colors is not recommended, as this results in undesirable discoloration.

Fuel cell vehicles require a special coolant for cooling the fuel cell. This coolant must not come into contact with other coolants or water under any circumstances. Furthermore, special test and filling equipment is required. Coolants for fuel cell vehicles may be refilled only in an F-CELL terminal point.

3. Mixing Ratio

3.1. For the 326.x sheets

The products specified in the Specifications for Operating Fluids 326.x are pre-mixed coolants with an optimum composition. The mixing ratio is 50 % antifreeze and 50 % water; products as per 326.64 are the exception; their mixing ratio is 40 % antifreeze and 60 % water. They are to be mixed with additional water only in exceptional cases, see Table 1. The water quality must satisfy the requirements specified in Chapter 3.3.

MB approval and miscibility must be observed if they are used, see Table 3.

3.2. For sheets 325.x

All concentrates or antifreezes listed in sheets 325.x must be mixed with water as per Table 1 before use. The specified mixing ratios are important, e.g. for the freezing point, the boiling point, heat dissipation and the portion of anti-corrosion protection. The water quality must satisfy the requirements specified in Chapter 3.3.

3.3. Target concentration of the coolant and water quality

Should the specified concentration deviate from Table 1, the mixing ratio must be corrected immediately; exception, see *. Determining the concentration, see Chapter 5.

Table 1: Target concentration of antifreeze with corrosion inhibitor and water			
Sheet No.		325.0/6/7 (*)	326.64 (**)
Mixing ratio	Concentrate % by volume	50	40
	Water % by vol.	50	60
Tolerance % by vol.		± 5	± 5

(*): Models 415, 453.0/3/4, and 470 that were filled with products from Specifications for Operating Fluids sheet 325.7 with 40 % by vol. concentrate ex works need not be adjusted to a 50:50 mixing ratio.

(**): Applies only to M178 engines in model 190.381.

Even with extremely low ambient temperatures, not more than 55 vol.-% antifreeze is to be used. With 55 % by volume of antifreeze, the maximum antifreeze protection, approx. -45 °C, of an aqueous ethylene glycol solution is achieved; a higher antifreeze portion reduces antifreeze protection and heat dissipation in the engine, which can cause irreparable damage.

For the mixture of water and concentrate, the water quality should meet the following requirements (see Table 2). Drinking water often meets the desired requirements. If no information on water quality or no suitable water is available, distilled or deionized water shall be used to build up the coolant. Seawater, brackish water, brines and industrial wastewater are not suitable.

Table 2: Water quality			
Water quality		min	max
Earth alkali ions	mmol/l		2,7
Hardness	°dH		15
Chloride	mg/l		80
Chloride + sulfate	mg/l		160
pH-value	-	6,5	8,0

1°dH = 0.1783 mmol/l alkaline earth ions = 7.147 mg/l Ca²⁺ or 4.336 mg/l Mg²⁺

4. Ingredients

The coolants and antifreezes with corrosion inhibitor are based on ethylene glycol as the antifreeze component, but differ with regard to the remaining ingredients, e.g. for corrosion protection; see table 3.

Table 3: Specifications for Operating Fluids sheet number and coolant type						
Coolant sheet no.	Antifreeze with corrosion inhibitor sheet no.	Color	Inhibitors		Free of	Compatible with sheet no.
			inorganic	organic		
326.0	325.0	Blue-green	Si, B	X	Nitrite, amine, phosphate	
326.6	325.6	Pink	SI	X	nitrite, amine, phosphate, borat, 2- ethylhexanoic acid	326.64, (also 325.0, 326.0, see ***)
326.64	-	Pink	SI	X	nitrite, amine, phosphate, borat, 2- ethylhexanoic acid	325.6, 326.6
326.7	325.7	Yellow, blue	-	X	Nitrite, amine, borate, silicate	-

(***): Backward compatibility only; Products from 325.0/326.0 are not allowed in vehicles produced after 04/2014

5. Monitoring coolant operation

The engine cooling system is designed maintenance free for normal operation until the change interval of the coolant is reached when the corrosion inhibitors have been used up.

In the course of servicing, the coolant level is checked at certain vehicle-specific intervals for safety-related reasons. If it is found in this process that the coolant level is too low, the engine cooling system must be checked for proper condition and fluid loss, and the coolant must be checked for the correct anti-corrosion agent/antifreeze content in accordance with the vehicle-specific specifications. This also applies if the coolant warning lamp should light up in the vehicle during operation. Any problems that were identified must be rectified to ensure the safe operation of the engine cooling system.

The check of the anti-corrosion agent/antifreeze content mixing ratio must be performed with suitable equipment. To do this, the density or the refractive index can be used to determine this according to Table 4. For individual coolants, the information on the mixing ratio may vary slightly from the values given in Table 4.

Should the coolant concentration deviate from Table 1 in Chapter 3, the mixing ratio must be corrected immediately. The following calculation aid can be used to calculate the top-up quantity.

Table 4: Concentration/antifreeze protection/density/refractive index (approx.)						
Sheet No.		325.x, 326.x				
Concentration	vol %	35	40	45	50	55
Freezing point	°C	-20	-25	-32	-37	-45
Density (20 °C)	g/cm³	1,052	1,060	1,067	1,073	1,079
Refractive index n_{20°}	-	1,371	1,376	1,382	1,387	1,391

Calculation of coolant quantity to be added for low concentration (Specified: 50 Vol.-%)

- Coolant content (total) in liters
- Measured concentration in Vol.-%

Computational formula:

- $(50 - \text{measured concentration}) \times \text{coolant content} / (100 - \text{measured concentration}) = \text{top-up quantity for corrosion/antifreeze}$

Example of calculation:

- Coolant content (total) = 8 liters
- Measured concentration = 36 Vol.-%
- $(50 \% - 36 \%) \times 8 \text{ l} / (100 \% - 36 \%) = 1.75 \text{ liters}$

This calculated quantity should normally be drained off beforehand.

6. Disposal of coolants

The statutory regulations or waste water ordinances in each individual country must be observed when disposing of used coolant. It is recommended to clarify the possibilities for disposing of materials with the local authorities responsible.