

BB00.40-P-0310-01A	Coolant specifications		
--------------------	------------------------	--	--

Note: These regulations apply to the Mercedes-Benz, Maybach, smart and Setra brands.

WARNING

The tasks that the antifreeze with corrosion inhibitor, coolants or coolant additives have to perform are as important as those of a component. Products and brands

that are not mentioned in the following Specifications for Operating Fluids sheets do not have MB approval and can lead to **significant restrictions** in the engine output and/or **irreparable damage** to the cooling system.

1. Terms used

Antifreeze with corrosion inhibitor:

Component of the coolant for combustion engines as corrosion and antifreeze protection, for lowering the freezing point as well as raising the boiling point. Can also be called "concentrate". Must be used with water as per chapter 3.1.

Coolant, KM:

Mixture of antifreeze with corrosion inhibitor and water for cooling engines. Coolants normally consist of antifreeze with corrosion inhibitor and water.

Coolant additives:

Anticorrosion agent that can be used for special applications mixed with water. The mixture has no antifreeze protection!

MB approval:

Marking of the coolants or antifreezes/anti-corrosion additives that are tested by Daimler AG and approved for the corresponding use, see table 1.x and 2. On the containers with tested brand-name products, you will find **MB approval 325.0**, for example, as a note.

2. Overview

Tables 1.1, 1.2 and 2 provide an overview on the use of the approved antifreezes/anti-corrosion additives and the maximum change intervals. These coolants have the following characteristics:

- Ensure heat transfer
- Long-term corrosion and cavitation protection for all components of the cooling system
- Ensure antifreeze protection
- Increase boiling point
- Resistant against microorganisms
- Effective foam suppression

Vehicles with combustion engine are defined in the assignment via the engine model series, see tables 1.x and 2.

The sheet numbers 325.x show the antifreezes with corrosion inhibitor. These **must** be mixed with water before use as per chapter 3.1.

The sheet numbers 326.x show the ready-to-use coolants. These **must not** be mixed with water.

Vehicles with a fuel cell require a special coolant for cooling the fuel cell. Coolants for fuel cell vehicles must only be refilled in an F-Cell support point.

Table 1.1: For passenger cars and vehicles with passenger car combustion engines except for smart and Mercedes Citan

Sheet No.	Major assembly model series		Comment	Change interval years/km Whatever applies first must be observed.
	M1xx/ M2xx	OM6xx		
325.0 or 326.0	•	•	For all vehicles with a manufacture date up to and including April 2014	15/250,000 ⓘ Exception: Different change intervals are specified in the vehicle maintenance manual.
325.6 and/or 326.6	•	•	Usable for all vehicles	15/250,000 ⓘ Exception: Different change intervals are specified in the vehicle maintenance manual.

Table 1.2: For passenger car combustion engines of smart (model series 453.0/3/4) and Mercedes Citan (model series 415)

Sheet No.	Major assembly/ vehicle model series	Comment	Change interval years/km
			Whatever applies first must be observed.
325.6 and/or 326.6	M281 in smart (model series 453.0/3/4)	• In the case of top-up quantities less than 10 % by volume: may be mixed with coolant (yellow) filled ex production plant.	6/60.000
	OM607 in Mercedes Citan (model series 415)	• In the case of top-up quantities greater than 10 % by volume: may not be mixed with coolant (yellow) filled ex production plant; empty cooling circuit and refill	4/160.000

Table 2: For vehicles with commercial vehicle engines

Sheet No.	Major assembly model series without secondary water retarder (SWR)							Major assembly model series with secondary water retarder (SWR)	Change interval in years
	OM300	OM400	OM904 up to 926	OM934 , 936	OM457 , 460	OM500	OM470 up to 473		
311.0	•	•							0.5
312.0	•	•	•		•	•			1
325.0 or 326.0	•	•	•		•	•			3
325.3 or 326.3	•	•	•		•	•			5
325.5 or 326.5			•	•	•	•	•		3
							•		2

Coolants or antifreezes with corrosion inhibitor that are listed in tables 1.1, 1.2 and 2 in different sheet numbers may not be mixed with each other, as a significantly lower

anti-corrosion protection and/or incompatibility with the cooling system can lead to irreparable damage.

3. Coolant

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 anti-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.	Inhibitors		Free of
		inorganic	organic	
326.0	325.0	Si, B	X	Nitrite, amine, phosphate
326.3	325.3		X	Nitrite, amine, phosphate, borat, silicate
326.5	325.5	SI	X	nitrite, amine, phosphate, borat, 2-ethylhexanoic acid
326.6	325.6	SI	X	nitrite, amine, phosphate, borat, 2-ethylhexanoic acid

3.1. Mixing ratio

All coolants from sheets 326.x are ready-to-use mixtures. These **must not** be mixed with additional water.

In contrast, all antifreezes with corrosion inhibitor from sheets 325.x must be used with approx. 50 % by volume of water, this corresponds to antifreeze protection down to

-37 °C. The water quality must satisfy the requirements in the following chapter.

Even with extremely low ambient temperatures, not more than 55 vol.-% antifreeze with corrosion inhibitor is to be used. With 55 % by volume of antifreeze with corrosion

inhibitor, the max. antifreeze protection (approx. -45 °C) of an aqueous ethylene glycol solution is reached. A higher antifreeze with corrosion inhibitor rate reduces the antifreeze protection and the heat dissipation in the engine, this can lead to irrevocable damage.

Sheet No.	Mixing ratio	
	Concentrate % by volume	Water % by vol.
325.0	50	50
325.3	50	50
325.5	50	50
325.6	50	50
311.0	1	99
312.0	10	90

In special cases (commercial-vehicle engines, no antifreeze specification) coolant additives can be used that are primarily corrosion protection additives.

4. Water quality

Clean and the softest possible water should be used for processing the coolant. Drinking water often satisfies the requirements. Information concerning the water quality of drinking water is available from the local water-plant authorities or the official water utilities on request.

If there is no available information regarding the water quality or if no suitable water is available, then distilled or

deionized water should be used to prepare the coolant. Sea water, brackish water, brine and industrial waters are not suitable. Salts may promote corrosion or form disruptive deposits.

The analysis values of the water for mixing coolants must be within the limits of table 5.

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⁺

With the use of premixed coolant, compliance with the concentration (50/50) must also be observed in addition to the MB approval.

4.1. Coolant additives for commercial vehicle engines without antifreeze specification

In climate zones free of frost year round, no antifreeze protection is required as the cooling systems are adapted to coolant according to sheet 325.x and 326.x. Only in justified exceptional cases an aqueous solution with corrosion protection should be used. The use of anticorrosion agents in water is limited to the engines named in table 2. The use of anticorrosion oil emulsion

according to sheet 311.0 is limited thermally. The emulsion must therefore not be used in efficient modern engines.

Mixtures of different products as stated in sheet 311.0 and 312.0 are not permitted.

The following must be observed when creating anticorrosion oil emulsion according to sheet 311.0:

When carrying out a new filling (initial filling or filling after a cleansing operation), an emulsion of 1.0 - 1.5 % by volume

must be used. When refilling, an emulsion of 0.5 - 1.0 % by volume should be used. Concentrations that are too high (>1.5 % by volume) do not improve the corrosion

protection, but rather exert a negative influence on seals and hoses.

5. Monitoring coolant operation

During operation, the corrosion inhibitors of the coolant are consumed and the mixing ratio may change due to water evaporation. It is therefore very important to regularly monitor the coolant if the engine is to run trouble free.

determine this in accordance with picture 1 or the refractive index in accordance with picture 2. The specifications on the mixing ratio may vary slightly for individual coolants from the values in pictures 1 and 2.

The inspection of the mixing ratio should be conducted with suitable apparatus. To do so, the density can be used to

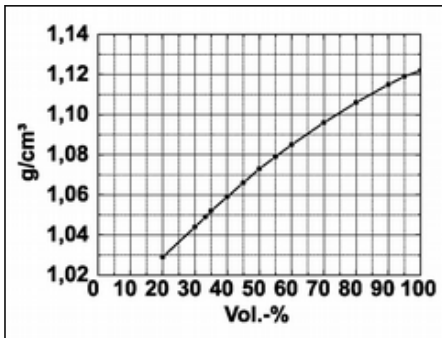


Bild 1:

Density of KFM/water mixtures

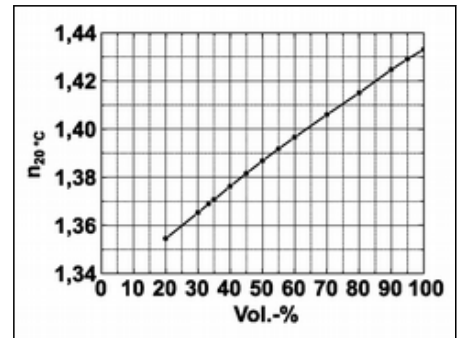


Bild 2:

Refractive index of KFM/water mixtures

P00.40-2032-01

P00.40-2033-01

If the coolant should only contain 45 % by volume or more than 55 % by volume of antifreeze with corrosion inhibitor, the **mixing ratio must be immediately corrected**. To calculate the refill quantity, the following calculation aid can be used:

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

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

Computational formula:

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

Example of calculation:

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

This calculated quantity should normally be drained off beforehand

Refrigerant protection/concentration table (approx.)							
°C	-9	-12	-16	-20	-25	-32	-37
vol %	20	25	30	35	40	45	50

6. Disposal of coolants

The coolants are biologically-degradable material. The statutory regulations or waste water ordinances in each individual country must be observed when disposing of

used coolant. It is recommended to have the possibilities available for disposing of materials explained by the local responsible water authorities.