

Mercedes-Benz	Fatty acid methyl ester (FAME) as diesel fuel	MB BeVo 135.0
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 In all cases the latest German-language version of this
 Standard shall be taken as authoritative.

Preliminary remark

Mercedes-Benz diesel engines are fundamentally designed for diesel fuel, which complies with respective national and European requirements. Other types of fuel are not generally planned for. In the interest of using biomaterials and supporting domestic agriculture the past few years have entertained discussions on the possible application of "Bio-diesel fuels". In chemical terms these so-called "bio diesels" are mainly vegetable oils, which can be transformed as the result of a chemical reaction into appropriately mixed fatty acid methyl esters (FAME).

Because the most varied of abbreviations are used to describe bio-diesel fuels we have listed below a brief "glossary":

FAME Fatty acid methyl ester, generic term, to be used in future as part of the European standard
 PME vegetable oil fatty acid methyl ester, previously used generic term within German-speaking area
 RME rape seed oil fatty acid methyl ester, specific "bio diesel fuel" made from rape seed oil

We are fundamentally against the use of non-transesterified oils (of vegetable or animal origin) as diesel fuel as a consequence of our negative experience in this area (carbonization, deposits in the combustion chambers etc.).

Further on in the text we describe "bio-diesel fuel" as "FAME" in harmony with the European standardization activities although our experience is basically restricted to RME.

FAME may well have a future as a niche fuel product and be used in those areas where the ecological advantages are particularly promoted (e. g. in water conservation areas).

1 Approval status

A general approval in the passenger car area is not possible due to material incompatibility. For individual models, E 200/220 D, C 200/220 D and as of 8/99 W 202 with OM 611 and as of 11/99 in W 210 with OM 611 vehicle equipment capable of operating on FAME is available as special equipment. C 200 D was converted to FAME capability in general at the start of 1995. The vehicles mentioned mainly contain other, consistent elastomers in the fuel and fuel injection system.

Additional details, in particular on the spare parts valid for this can be obtained from the Service Information dated 16.12.94 (Group 00/127), dated 24.7.95 (Group 00/133) and 00.40-P-0005A dated 8.9.99. The approval of MB commercial vehicles and MB industrial engines for FAME operation are governed by service information releases (STIN, e.g. No. 00.00S0028), which are available to the MB field organizations; they describe the approval status with regard to type of vehicle, year of construction, any possible conversion measures required etc. for SK, MK, trucks, omnibuses, transporters and Unimogs

2 Technical situation

2.1 Engine values

In comparison to diesel fuel operation the following engine values are valid for FAME operation:

		Continued on page 2 to 3
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- The volumetric fuel consumption is slightly higher because of the lower calorific value.
 - The rated output is somewhat lower on account of the lower calorific value.
 - Emissions are similarly low to those of direct injection engines (trucks; buses). The black smoke level is considerably lower.
- Adequate endurance testing of prechamber engines will not be conducted.

In the event of unfavorable conditions, in particular where the engine idles for a long time, an unusual odor may result.

is present. The use of an oxidation catalytic converter will result in a significant reduction in HC, CO and particulate emissions as well as any odors.

2.2 Fuel

These Specifications for Service products apply to pure FAME, not to mixtures of FAME and diesel fuel. In vehicles approved for FAME operation it is however permissible to use FAME or diesel fuel alternately, without the need for any additional measures. We would point out that in Germany the mixing of FAME and mineral diesel fuel, without taking into account the taxation aspects (post taxation) outside the vehicle tank, is not permitted.

The fuel must comply with the standard draft
EN 14214 specifications.

It is particularly important that pr EN 14214 is complied with, as operation with a poor quality fuel may lead to malfunctions and damages.

2.3 Engine oil

With regard to its disposal the following applies in general:

Not every producer of engine oil on a dual raffinate basis is in a position to process engine oils, which exhibit a specific FAME content. The customer should ask at his/her used oil dealership.

2.3.1 CVs

Engine oil quality as under MB Specifications for Service products sheet 227.0 through sheet 228.5 are suitable (preferably as under sheet 228.3 or 228.5). The oil change intervals must be halved when compared with operation with a diesel fuel. Details on the use of the Flexible Service Systems (FSS) can be found in the above service information.

It has not yet been finalized as to whether all engine oils approved for diesel fuel operation are also suitable for FAME operation.

2.3.2 Cars

The same oil change intervals apply here as for diesel fuel.

Replace the fuel filter at 1000 to 5000 km as well as every 30.000 km.

When diesel fuel is used for longer periods (> 10000 km) the fuel filter must be changed shortly after converting to FAME (at 1000 - 2000 km).

Vehicles which are converted to FAME and are laid up for more than 2 weeks are to be converted to diesel fuel and driven for at least 30 minutes.

When temperatures drop to below - 10°C it is advisable to change to commercial winter diesel fuel.

2.4 FAME resistance of components

Commercial vehicles:

In some vehicle models not all components, particularly those made from elastomer material, are resistant to FAME when subject to continuous operation. Suitability for FAME operation has to be checked for each individual vehicle model for reasons of road and operating safety and may, where applicable, in some cases be

given through specific modifications. More details are given in the service information releases as listed under 1).

Passenger cars:

The material in elastomer hoses and seals in the fuel supply system has to be converted to fluoro rubber; the availability of such parts is permissible for specific models only (see "Approval status"). More details are given in the service information releases as listed under 1).

2.5 Miscellaneous

The question regarding winter capability/cold starting has not been solved. Depending upon the vehicle and the engine it may be necessary to install a fuel pre-heater system to cope with minus temperatures.

FAME is an excellent solvent. Therefore it is advisable to prevent coming into contact with the paint surface when refueling.

3. Legal situation

3.1 Fuel standard

The standard EN 14214 applies to FAME as diesel fuel. At the time of preparing this specification this regulation is in the agreement phase of the European standardization committees.

3.2 General operating permit

When in FAME mode the rated output as specified by the manufacturer may drop by more than 5 %. This does not invalidate the general operating permit.

When an oxidation catalytic converter is used in a commercial vehicle the question as to the validity of the general operating permit remains unresolved.