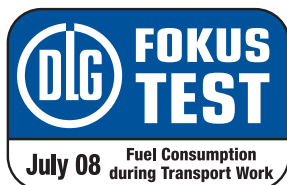


Daimler AG

Mercedes-Benz Unimog U 400

Fuel Consumption during Transport Work

DLG Test Report 5810F



Registering company

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Brief description

As a tractor unit and implement carrier, Unimog model U 400 is frequently used for transportation work with trailers.

Content of the test

The content of the test was to determine the fuel consumption of a Unimog U 400 during transportation work with a trailed load of 21 t on a tandem central axle trailer. The consumption was determined at two different vehicle speeds during operation in public road traffic. The routes driven were approx. 19 km on the flat and approx. 5 km on hills.

The measurement results of other tractors, which were driven over the same routes with the same trailer, are used for comparison purposes. A U 400 with mechanical manual gearbox was used. The Unimog itself was not loaded.

Evaluation – Short Version

Tested criterion	Test result	Evaluation
Fuel consumption		
On transportation with a trailed load of 21t on the flat at 60 km/h	very good	++
On transportation with a trailed load of 21t on the flat at 50 km/h	very good	++

Evaluation scale: ++ / + / o / - / -- (o = standard)

Specifications

Unimog U 400

Rated engine power*	205 kW
Rated speed*	2,200 rpm
Emission level	Euro3/Euromot 3A
Kerb weight	7,940 kg
Permissible gross vehicle weight	12,500 kg
Permissible trailed load	27,500 kg

* Manufacturer specifications, measurement of pto power not possible due to technical test rig limitations

Measuring Method

During the road tests, the total time required and the fuel consumption were determined (approx. 19 km on the flat and approx. 5 km on hills).

In addition, six individual measurements were carried out in steady-state operation during driving, with a test course length of approx. 200 m in each case. The engine speed was also recorded in this case.

The consumption was determined using a Pierburg PLU 116 gauge in the short circuit (return flow of fuel from engine fed back into the supply line).

A distance metering wheel (Peiseler wheel) was used to measure the distance and vehicle speed.

For the Unimog, two test drives were measured at the maximum speed of 60 km/h permissible for this vehicle category on Federal highways and two test drives with reduced engine speed at a maximum speed of approx. 50 km/h.

Test results and individual evaluations

	U 400	U 400	Average value of comparison tractors
Maximum driving speed	60 km/h	50 km/h	50 km/h
Driving time	1363 s	1602 s	1584 s
Driving time, decimal	0.39 h	0.45 h	0.44 h
Average speed	51.89 km/h	44.11 km/h	44.51 km/h
Total consumption	8.80 l	8.41 l	14.03 l
Mean consumption	23.25 l/h	18.89 l/h	32.07 l/h
Calculated consumption	44.79 l/100 km	42.84 l/100 km	71.89 l/100 km
Calculated consumption	24.88 ml/tkm	23.80 ml/tkm	34.23 ml/tkm

Table 2:

Overall transportation test drive results on the even road over 19.5 km, mean values from two measurement drives with a trailed load of 21 t

The specified consumption in l/h is a measure of the mean loading of the engine during the measurement drive; the specified consumption in litres over 100 km (l/100 km) is calculated from the total consumption and the route for the entire measurement. The value ml/t km (fuel consumption in millilitres per tonne of trailed load and kilometre) is only calculated from the trailed load, but also includes the pulling vehicle's consumption for its own forward movement. The comparison tractors with continuously variable gearbox or powershift gearbox had rated engine outputs of between 158 and 243 kW with permissible gross vehicle weights of between 13.1 and 16 t. The comparison tractors were also operated in the mode for economy-minded driving.

The results of the measurement drives on the even road clearly show that the Unimog can be used very economically for transportation work due to its high design speed. If the vehicle speed in the eighth gear of the on-road range is limited to 60 km/h with the cruise control, the engine speed is then only approx. 1250 rpm; as a result, the engine operates in an economical range. On reduction of the speed to 50 km/h, the speed usual for tractors, the engine speed drops to approx. 1050 rpm; this leads to a further reduction in consumption. In practice, however, driving is usually carried out at the speed of 60 km/h which is permissible on Federal highways. The measurement drives at 50 km/h served primarily for comparison with tractors with a design speed of 50 km/h; these are frequently used for transportation in agriculture.

During the measurements, it was ascertained that the power available at this low engine speed is sufficient for the Unimog to perform well whilst towing a trailer. Small inclines can also be ascended without downshifting in the eighth gear of the on-road range.

During the measurement drives on a 5.1 km long hill route with alternating inclines, the consumption and vehicle speed advantages over the comparison tractors were less significant. Although the Unimog also had to be driven at a higher engine speed, the values for overall consumption over the route were still approx. 20% lower. These values cannot be generalised for practical purposes, as the relevant incline determines the engine speed in the case of the Unimog's multi-step gearbox.

Summary and evaluation

During the transportation measurements on even roads, fuel consumption was significantly lower than that of comparable agricultural tractors.

When driving at 60 km/h on Federal highways and country roads, the engine speed can be reduced to a very low level in the highest gear, resulting in a significant consumption advantage without lessening the vehicle speed.

The vehicle also enables fuel to be saved when driving on hilly routes.

These results were evaluated as very good.

Test

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