

Diesel fuels should be used for industrial engines that comply with the quality requirements as under Sheets 131.0, 132.1 and 132.3.

For direct injection engine models used in model series **300 and 400** diesel fuels with a different grade may be used in special cases if the fuels meet the following minimum requirements:

Minimum diesel fuel requirements for direct injection engines in model series 300 and 400

Characteristics				Requests	Test method		
					DIN	ASTM	IP
Density	at 15 °C	g/ml	max.	0.92	51757	D 1298	160
Viscosity	at 20 °C	mm ² /s	max.	17	51550	D 445	71
	at 100 °F	mm ² /s	max.	9			
Final boiling point		°C	max.	390			
Calorific value (lower)		MJ/kg	min.	40.8	51900	D 240	12
Flash Point		°C	min.	65	51755		170
Carbon residue		percent by weight	max.	1.5	51551	D 189	13
Ash content		percent by weight	max.	0.02	51575	D 482	4
Sulfur content		percent by weight	max.	1.8	51768	D 1551	63
Water content		percent by weight	max.	0.25	51777	D 1744	
Sediment		percent by weight	max.	0.05		D 473	53
Ignition Quality		Cetane number	min.	40	51773	D 613	41

The increase in sulfur content which these grades normally exhibit, requires shorter oil change intervals.

If the sulfur content of the diesel fuel is more than 0.5 % by weight, extreme operating conditions apply to the engine oil change. For this reason the oil change intervals, insofar as no extreme service conditions are prevalent, must be halved. If the diesel fuel's sulfur content is more than 1.0 % by weight, the oil change must always be made subsequent to maintenance category I (refer also to sheet 215.0, Section 3.6).

Particularly where diesel fuel with a high sulfur content is used it is very important to ensure that only tested and approved engine oils as under sheets 228.0/1/2/3 /5 are used. The higher the grade of oil the easier it is to compensate for the negative effect exhibited because of the sulfur content.

If the fuel has a high viscosity it may be necessary to conduct a fuel preheating operation.

If the density of the diesel fuel is greater than 0.86 g/ml at 15 °C, the injection quantity is to be reduced as follows:

Quantity Reduction for Various Fuel Densities

Density at 15 °C	Required fuel-quantity reduction
g/ml	%
0.86	1.5
0.87	3.0
0.88	4.5
0.89	6.0
0.90	7.5
0.91	9.0
0.92	10.5

To this end the injection pump should be removed and readjusted on the injection-pump test bench taking the fuel-quantity reduction into account. This work must be conducted by skilled personnel only.

The fuel precleaner and fuel filter should be checked and cleaned on a more regular basis. In some cases it may be necessary for such diesel-fuel grades to undergo a centrifuging operation beforehand.

It should be pointed out that the use of unfavorable diesel fuel grades will exert a considerable influence on the engine output as well as its service life. If such unfavorable diesel-fuel grades are used it is impossible to achieve the same results as when using excellent diesel-fuel grades. These special cases, i.e. the use of the above fuel qualities are to be clarified in advance with the Abteilung Betriebsstoffe EP/MGB (operating fluids department).