



Engine Oil Analysis Specifications - US10 And Newer Emissions



> Internal Content

If oil dilution is suspected refer to the applicable CBR sister solution below.

- **K30024143** Mack Chassis - Oil Diluted With Fuel; Fuel In Oil, Diagnostic Information - All Emissions, All Model Years
- **K22396588** Volvo Chassis - Oil Diluted With Fuel; Fuel In Oil, Diagnostic Information - All Emissions Prior To US17+OBD16 (Common Rail Fuel System), Model Year 2017 And Older
- **K12213022** Dye Test Procedure; Fuel System Leak Check - Common Rail Fuel System - US17+OBD16 And Newer Emissions, Common Model Year 2018 And Newer

It is recommended that engine oil analysis be reviewed using the specs listed below.

Mack Engine Oil Requirements for External Use (Customers, Dealers, Laboratories, Suppliers, etc.)			
	Property	Method	Requirement Acceptable Limit
Wear and contaminant elements	Fe	ASTM D51851	< 130 ppm ²
	Pb		< 40 ppm
	Cu		< 40ppm ²
	Sn		< 20 ppm
	Cr		< 10 ppm
	Al		< 30 ppm ³
	Ni		< 20 ppm
	Si		< 30 ppm ²
	Mo		< 10 ppm(4)
	K		< 20 ppm ³
	Na		< 20 ppm
	B		< 10 ppm(4)
Contaminants	Water	ASTM D6304 ¹	< 0.1%
	Fuel	ASTM D3524 ¹	< 4%(6)
	Soot	TGA or FTIR	< 3%
Condition	Viscosity at 100°C	ASTM D445	> 9.3 cSt

	TBN	ASTM D4739	≥ 2
	Oxidation (net)	ASTM E168 Peak Height (1)	< 25
	Nitration (net)	ASTM E168 Peak Height (1)	< 30

Guidelines to be followed:

1. Or equivalent.
2. May be higher during running in (first few drain intervals)
3. Very high copper (Cu) levels, more than 500 ppm, are sometimes found during the first 60,000 miles of the vehicle life. The source is the oil cooler and the copper levels normally drop in consecutive drain intervals.
4. AL and K may be simultaneously high during the first few intervals. The source is then likely the charge air cooler and particles are soft and harmless. The K · Al ratio is then typically 2 - 3 : 1.
5. Some oils may contain Mo and/or B. Check fresh oil values.
6. Up to 4% fuel dilution is acceptable without further actions. Even higher fuel dilution may be accepted if viscosity is >9 cSt and TBN is >3 . If fuel dilution is $>9\%$, drain the oil immediately and monitor fuel dilution with new samples. If fuel dilution still exceeds 9%, reduce drain intervals to 70% of the oil mileage at which the sample was taken.



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