

Section 4.6 Used Lubricating Oil Analysis

Detroit Diesel's used-oil analysis program is recommended for all engines. Oil analysis consists of laboratory tests to indicate conditions of the engine and/or the lubricant. The "Warning Limits" are listed in Table "Single Sample Used-Oil Analysis Warning Limits", "Single Sample Used-Oil Analysis Warning Limits." Oil analysis cannot completely assess the lubricating oil and should not be used to maximize oil drain intervals. Change oil immediately if contamination exceeds warning limits listed in Table "Single Sample Used-Oil Analysis Warning Limits".

Characteristics	ASTM or Other Methods	Conditions Measured	Four-Stroke Cycle Engine Series			Two-Stroke Cycle Engine Series
			40, 50, 60	55	MBE 900	MBE 4000
Viscosity at 100 °C, cSt, Min	D 445	Engine & Oil	12.5			12.5
	DIN 51562		SAE 15W-40			SAE 40
Viscosity at 100 °C, cSt, Max	D 445	Engine & Oil	21.9			16.3
	DIN 51562		SAE 15W-40			SAE 40
Soot, %*	TGA (E1131)	Engine Combustion	4.5†			0.8
Total Base No., Min	D4739	Oil	1/3 New or			—
	D2896		3.0 mg KOH/g			—
Total Base No., Min	ISO 3717	Oil	1/3 New or			—
	D2982		3.0 mg KOH/g			—
Glycol, Max	DIN 51375	Engine	Negative			—
	E203		0.3%			—
Water, Max	E203	Engine	0.3%			—
Fuel Dilution, Max	D3524	Engine	2.5%	7%	—	2.5%
Fe, Max ‡	D5185	Engine Wear	200 ppm		200 ppm	150 ppm
Al, Si, Cu, Max ‡	D5185	Engine Wear	30 ppm		50 ppm	25 ppm
Pb, Max ‡	D5185	Engine Wear	30 ppm		10 ppm §	10 ppm
Na, Max ‡	D5185	Engine Wear	100 ppm		100 ppm	—
K, Max ‡	D5188	Engine Wear	150 ppm		150 ppm	—

Table 1. Single Sample Used-Oil Analysis Warning Limits

* Infrared spectroscopy (ASTM E 168/DIN 51452) may also be used, provided it is calibrated to be equivalent to the TGA method.

† With PGOS approved oils

‡ These are general limits. Wear metal limits must be determined for specific application and oil used.

§ The DD15 is a lead-free engine. No meaningful amount of lead should be found in the oil.