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Oil analyses



WARNING!

Please pay attention to the safety instructions in the Operator's and Service Manuals concerned.

Various companies carry out oil analyses on VCE's machines. A great risk with these analyses is that their monitoring limits in certain cases lie at other levels as compared with ours.

This means that customers receive alarm reports and are worried entirely unnecessarily.

The reason for that other companies have different monitoring areas than VCE, is that they do not have detailed knowledge of the specific properties of our components, and believe that we have the same monitoring limits as our competitors. For VCE machines the monitoring limits according to tables 1 and 2 apply.

Table 1

Monitoring limits for components made by Volvo:

Particle		Engine	HT-transmission	PT-transmission	Dropbox	Note
Aluminium	Al	30	30	50	30	PPM
Lead	Pb	40	1200	50	30	PPM
Iron	Fe	200	100	100	500	PPM
Silica	Si	20	50	50	50	PPM
Copper	Cu	20	300	300	30	PPM
Chromium	Cr	20	20	20	20	PPM
Nickel	Ni	5	10	10	10	PPM
Tin	Sn	20	20	50	20	PPM
Water		0.20	0.20	0.20	0.20	%

The values are to be regarded as monitoring limits and not as absolute values.

It is important to establish a trend and not to make judgements based on isolated samples.

Table 2

Monitoring limits for components and hydraulic systems made by Volvo:

Particle		Axles, AWB (Axles with wet built-in brakes)	Axles, AH (Axles with dry external brakes)	Hydraulic system	Note
Aluminium	Al	30	30	20	PPM
Lead	Pb	50	50	20	PPM
Iron	Fe	500	900	50	PPM
Silica	Si	50	50	20	PPM
Copper	Cu	120	150	20	PPM
Chromium	Cr	20	20	20	PPM
Nickel	Ni	10	10	10	PPM
Tin	Sn	20	20	20	PPM
Water		0.20	0.20	0.20	%

The values are to be regarded as monitoring limits and not as absolute values.

It is important to establish a trend and not to make judgements based on isolated samples.

In cases where oil analysis shows a high PPM content, carry out:

- 1 Oil change and filter replacement.
- 2 Further oil analyses:
 - at first directly after the oil change and filter replacement.
 - and then three oil analyses at intervals of 100 hours.

These oil analyses provides an answer to the tendency, which may turn out as follows:

- 1 PPM content drops. Wear is normal.
- 2 PPM content remains at a high but stable level. Wear is normal.
- 3 PPM content continues to rise. This indicates abnormal wear and the customer should be informed.
- 4 PPM content varies greatly up and down. This indicates presence of foreign particles caused by working environment, storage of oil etc.

It is important to note that iron content rises with faulty air cleaner system before it is possible to note rising silicon content, that is, in the case of rising iron content, the air cleaner system should be checked.

Oil sampling should be carried out as follows:

- The oil should be at normal operating temperature.
- The engine should be running at low idling and a draining hose should be connected to a pressure outlet for the transmission.
- Regarding engines where there is no pressure outlet, the oil should be sucked up with the aid of a "hand pump".

The sample bottle must not be filled directly from the drain plug, as the oil at the bottom of the sump may have a higher concentration of contaminants and this will lead to a misleading analysis. The possible origin of the different particles is shown in table 3.

Certain breakdowns can develop fairly quickly, that is, an oil analysis at x hours may show normal PPM contents and a breakdown may occur prior to the next oil sample.

When in doubt as to what action should be taken as a result of the oil analysis, contact VCE Service Department.

Other aspects of oil analyses

All oils contain a varying degree of different additives in order to achieve required quality and performance requirements.

These additives also contain the metals which show up in the analysis. Various amounts of metals occur depending on:

- 1 Which type of oil is being produced (engine, transmission, axle oil).
- 2 Which company is making the oil.
- 3 On which market the oil will be sold (price, quality, competition).
- 4 Which requirements the customer demands.

The following metals occur:

Barium	Ba
Calcium	Ca
Magnesium	Mg
Boron	B
Phosphorus	P
Zinc	Zn
Sodium	Na

Table 3

Probable origin of particles

Particle		Engine	Transmission
Iron	Fe	Cylinder liners, camshaft, valve tappets, valve guides and crankshaft.	Clutch discs and ferrous parts of the transmission.
Lead	Pb	Big-end bearings and crankshaft main bearings. (All types of slide bearing). Oil cooler	Clutch discs and oil cooler.
Copper	Cu	Big-end bearings and crankshaft main bearings. (All types of slide bearing). Water and oil coolers	Clutch discs and oil cooler.
Tin	Sn	Slide bearings	Clutch discs
Chromium	Cr	Piston rings and valves.	Alloy metals
Aluminium	Al	Pistons	Bearings, clutches and torque converter
Silica	Si	Dust, dirt etc.	Dust, dirt etc.
Water		Cooling and condensation water	Cooling and condensation water