



# VOLVO CONSTRUCTION EQUIPMENT

# SERVICE BULLETIN

Language Code GB	Group 160	Product GRD	No. 60 K	Version 1	Date 2008-12-18	Page 1/4
Applies to models G930, G940, G946, G960, G970, G976, G990						

ONLY FOR DISTRIBUTORS / DEALERS

## Oil Analysis



### WARNING!

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

This Service Bulletin is to be considered as technical information only and is not subject to any reimbursement programs outside normal warranty.

### Cause

Various companies carry out oil analysis on Volvo Construction Equipment machines. A great risk with these analysis is that their monitoring limits may not reflect the same values selected by Volvo.

This means that customers may receive condition reports that are not justified.

To assist dealers and customers with accurate interpretation of oil analysis data the monitoring limits for applicable Volvo Construction Equipment machines are listed in tables 2 and 3.

### Action

Information only.

Table1. Ser. No.

Models	Ser. No.	
	GOD	PED
G930	39300 — up	501000 — up
G940	39300 — up	502200 — up
G946	39300 — up	
G960	39300 — up	505000 — up
G970	39300 — up	506000 — up
G976	39300 — up	
G990	39300 — up	508000 — up

**MORE CARE. BUILT IN.**

Volvo Construction Equipment Canadian Operations  
P.O. Box 10, Maitland Road, N7A 3Y6, Goderich, Ontario, Canada



**Table2. Monitoring limits for components made by Volvo**

Particle		Engine D7E	Engine D9B	HTE Transmis- sion	Units
Aluminum	Al	25	10	30	PPM
Lead	Pb	30	20	50	PPM
Iron	Fe	150	100	100	PPM
Silica	Si	20	20	50	PPM
Copper	Cu	20	15	50	PPM
Chromium	Cr	15	10	20	PPM
Nickel	Ni	10	10	10	PPM
Tin	Sn	10	10	20	PPM
Water		0.20	0.10	0.20	%
Soot		3*	2*		%
Fuel		5**	3**		%
Zinc	Zn	15			PPM

\* When VDS-3 oil is used: < 3%

\*\* If the fuel quantity reaches 1 – 2 % or more over a longer period of time, corrective action must be taken.

**NOTE!** 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 judgement based on isolated samples.

**Table3. Monitoring limits for components and hydraulic systems made by Volvo**

Particle		Hydraulic System	Final Drive	Tandem	Note
Aluminum	Al	20	30	20	PPM
Lead	Pb	20	50	50	PPM
Iron	Fe	50	500	1000	PPM
Silica	Si	20	50	50	PPM
Copper	Cu	150	300	50	PPM
Chromium	Cr	20	20	10	PPM
Nickel	Ni	10	10	5	PPM
Tin	Sn	20	20	5	PPM
Water		0.20	0.20	0.20	%

**NOTE!** 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 judgement 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 analysis:
  - 100 hours after the oil change and filter replacement.
  - two oil analyses at intervals of 100 hours.

These oil analysis will provide information to assist with interpretation of results:

- 1 PPM or % content drops to normal range. Wear is normal ( Monitor )
- 2 PPM content remains at high but stable level. Wear is normal ( Monitor )

- 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.

Engine is important to note that the iron content rises with a faulty air cleaner system before it is possible to note rising silicon content. 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 idle and a drain hose connected to a pressure outlet for the transmission.
- Regarding engines where there is no pressure outlet, the oil should be removed with the aid of a hand pump.

The sample bottle must not be filled directly from the drain plug as oil from the bottom of the sump may have higher concentration of contaminants; this could skew the analysis results.

Certain breakdown can develop quickly. An oil analysis at xxx hours may show normal PPM contents and a breakdown may occur prior to the next oil sample. These types of failures may not be detected by an increasing wear trend.

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

The possible origin of the different particles is shown in table 5.

### Other aspects of oil analysis

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

**Table4. The following metals can occur in new oils:**

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

**Table5. 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	Connecting rod bearings and crankshaft main bearings, (All types of slide bearings), water and oil coolers.	Clutch discs and oil cooler
Tin	Sn	Crankshaft and camshaft bearings	Clutch discs
Chromium	Cr	Piston rings and valves	Alloy metals
Aluminum	Al	Pistons	Bearings, clutches
Silica	Si	Dust, dirt etc.	Dust, dirt etc.
Water		Cooling and condensation water	Cooling and condensation water