

OIL ANALYSIS REPORT

Sample Rating Trend



[68952] VOLVO VNL 4447

Diesel Engine Fluid PETRO CANADA DURON SAE 10W30 (--- GAL)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

A Wear

Area

Nickel ppm levels are severe. Aluminum and iron ppm levels are abnormal. Cylinder, crank, or cam shaft wear is indicated. Exhaust valve wear is indicated. Piston wear is indicated.

Contamination

Test for glycol is negative. There is no indication of any contamination in the oil.

Fluid Condition

The oil is no longer serviceable as a result of the abnormal and/or severe wear.

SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0948227	WC0853672	
Sample Date		Client Info		07 Jun 2024	03 Oct 2023	
Machine Age	kms	Client Info		765309	651737	
Oil Age	kms	Client Info		0	96111	
Oil Changed		Client Info		Changed	Changed	
Sample Status				SEVERE	ABNORMAL	
CONTAMINATION	N	method	limit/base	current	history1	history2
Fuel		WC Method	>6.0	<1.0	0.7	
Water		WC Method	>0.2	NEG	NEG	
WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		0	0	
Iron	ppm	ASTM D5185(m)	>100	<u> </u>	<u> </u>	
Chromium	ppm	ASTM D5185(m)	>20	3	2	
Nickel	ppm	ASTM D5185(m)	>2	1 0	<u> </u>	
Titanium	ppm	ASTM D5185(m)		<1	0	
Silver	ppm	ASTM D5185(m)	>2	<1	<1	
Aluminum	ppm	ASTM D5185(m)	>25	A 32	14	
Lead	ppm	ASTM D5185(m)	>40	2	2	
Copper	ppm	ASTM D5185(m)	>330	15	17	
Tin	ppm	ASTM D5185(m)	>15	1	<1	
Antimony	ppm	ASTM D5185(m)		<1	0	
Vanadium	ppm	ASTM D5185(m)		0	0	
Beryllium	ppm	ASTM D5185(m)		0	0	
Derymann	ppin	A0110 D0100(III)		•	0	
Cadmium	ppm	ASTM D5185(m)		0	0	
•		,	limit/base			 history2
Cadmium		ASTM D5185(m)	limit/base	0	0	
Cadmium ADDITIVES	ppm	ASTM D5185(m) method		0 current	0 history1	history2
Cadmium ADDITIVES Boron	ppm ppm	ASTM D5185(m) method ASTM D5185(m)	1	0 current 5	0 history1 4	history2
Cadmium ADDITIVES Boron Barium	ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	1	0 current 5 <1	0 history1 4 <1	history2
Cadmium ADDITIVES Boron Barium Molybdenum	ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1	0 current 5 <1 64	0 history1 4 <1 84	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1	0 current 5 <1 64 2	0 history1 4 <1 84 2	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 1 10	0 current 5 <1 64 2 896	0 history1 4 <1 84 2 937	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 1 10 2942	0 current 5 <1 64 2 896 1232	0 history1 4 <1 84 2 937 1179	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 10 2942 1102	0 current 5 <1 64 2 896 1232 947	0 history1 4 <1 84 2 937 1179 947	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 10 2942 1102 1351	0 current 5 <1 64 2 896 1232 947 1185	0 history1 4 <1 84 2 937 1179 947 1203	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 10 2942 1102 1351	0 current 5 <1 64 2 896 1232 947 1185 2027	0 history1 4 <1 84 2 937 1179 947 1203 2124	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 10 2942 1102 1351 3903	0 current 5 <1 64 2 896 1232 947 1185 2027 <1	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 <1 history1 8	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 1 10 2942 1102 1351 3903 Imit/base	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 current	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 2124 <1 history1 8 8 224	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Chosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 1 10 2942 1102 1351 3903 Imit/base	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 current 10	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 <1 history1 8	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	1 1 1 1 10 2942 1102 1351 3903 limit/base >25	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 current 10 56	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 2124 <1 history1 8 8 224	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	1 1 1 1 10 2942 1102 1351 3903 limit/base >25	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 current 10 56 52	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 history1 8 224 ▲ 187	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) method ASTM D5185(m) ASTM D5185(m)	1 1 1 1 1 1 2942 1102 1351 3903 Imit/base >25 >20	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 current 10 56 52 0.0	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 × × × × × × × × × × × × ×	history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) AS	1 1 1 1 1 1 2942 1102 1351 3903 Imit/base >25 >20 Imit/base	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 10 56 52 0.0 current	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 × 1203 2124 <1 × 187 0.0 × 187 0.0	history2 history2
Cadmium ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINANTS Silicon Sodium Potassium Glycol INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	1 1 1 1 1 1 2942 1102 1351 3903 Imit/base >25 >20 Imit/base >3	0 current 5 <1 64 2 896 1232 947 1185 2027 <1 current 10 56 52 0.0 current 1	0 history1 4 <1 84 2 937 1179 947 1203 2124 <1 × × × × × × × × × × × × ×	history2 history2 history2



OIL ANALYSIS REPORT

iron 							
sesses nicke	Oxidation	Abs/.1mm	ASTM D7414*	>25	24.2	25.1	
	VISUAL		method	limit/base	e current	history1	history2
	White Metal	scalar	Visual*	NONE	NONE	NONE	
	Yellow Metal	scalar	Visual*	NONE	NONE	NONE	
	Precipitate	scalar	Visual*	NONE	NONE	NONE	
24	Silt		Visual*	NONE	NONE	NONE	
Uct3/23 Jun1/24	Debris	scalar	Visual*	NONE	NONE	NONE	
	Sand/Dirt	scalar	Visual*	NONE	NONE	NONE	
Glycol Contamination T ^{0.25}	Appearance	scalar	Visual*	NORML	NORML	NORML	
sodium	Odor	scalar	Visual*	NORML	NORML	NORML	
	Emulsified Water	scalar	Visual*	>0.2	NEG	NEG	
	Free Water	scalar	Visual*		NEG	NEG	
0.10 8	FLUID PROPERT	IES	method	limit/base	e current	history1	history2
-0.05	Visc @ 40°C	cSt	ASTM D7279(m)	74.0	77.2		
0.00	Visc @ 100°C	cSt	ASTM D7279(m)		11.4	11.3	
0ct3/23 Jun7/24	Viscosity Index (VI)	Scale	ASTM D2270*	146	139		
~ ~	GRAPHS		ш п.	-			
FT-IR (Direct Trend)	Iron (ppm)				Lead (ppm)		
Oxidation	300 T				100 Severe		
Sulfation	200 Severe						
Abnormal	Abnormal			udd	50 Abnormal		
	0				0		
	0ct3/23			/24 -	53.		24
					2		10
***************************************	00			Jun7/24	0ct3/23		
cd3/23 +	🔺 Aluminum (ppm)			Jun7	Chromium (pp	om)	(Level
0ct3/23 Jun7/24	Aluminum (ppm)			Jun J	Chromium (pp	om)	707 177
	Aluminum (ppm)				Chromium (pp	om)	2 Eenil
	Aluminum (ppm)			Jun7	Chromium (pp	om)	2 Earl
Viscosity @ 40°C	Aluminum (ppm)				Chromium (pp 60 40 Severe 20 Abnormal	om) 	
Viscosity @ 40°C	Aluminum (ppm)				Chromium (pp 60 40 Severe 20 Abnormal	om)	
Viscosity @ 40°C	Aluminum (ppm)				Chromium (pp 60 40 20 Abnomal	om)	Account Showing
Viscosity @ 40°C	Aluminum (ppm)				Chromium (pp 60 40 20 Abnomal 0 Silicon (ppm)	om)	
Viscosity @ 40°C	Aluminum (ppm)				Chromium (pp 60 40 20 Abnomal	om)	
Viscosity @ 40°C Abnomal Base Abnomal	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 Severe 60 60 60 60 60 60 60 60 60 60	om)	
Viscosity @ 40°C Abnomal	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 20 Abnomal 51 Silicon (ppm) 60 60	om)	
Viscosity @ 40°C	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 20 Abnomal 5 Silicon (ppm) 80 5 Silicon (ppm) 40 40 5 Silicon (ppm) 40 40 5 Silicon (ppm) 40 40 40 40 40 40 40 40 40 40	om)	
Viscosity @ 40°C Abnomal Base Abnomal	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 20 Abnomal 0 Silicon (ppm) 80 50 40 50 50 50 50 50 50 50 50 50 5	om)	
Viscosity @ 40°C	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 20 Abnomal 5 Silicon (ppm) 60 40 5 Silicon (ppm) 60 40 5 Silicon (ppm) 60 5 Silicon (ppm)	om)	
Anomal	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 50 50 50 50 50 50 50 50 50 5	om)	
Viscosity @ 40°C Abnormal Abnormal Abnormal 2Q Severe	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 50 50 50 50 50 50 50 50 50 5	om)	
Viscosity @ 40°C	Aluminum (ppm)			Jun7/24	Chromium (pp 60 40 50 50 50 50 50 50 50 50 50 5	om)	
Viscosity @ 40°C	Aluminum (ppm)			Jun7/24 Jun7/24 Jun7/24 Jun7/24 Dum	Chromium (pp 60 40 50 50 50 50 50 50 50 50 50 5	om)	
Viscosity @ 40°C	Aluminum (ppm)			Jun7/24 Jun7/24 Jun7/24 Jun7/24 Dum	Chromium (pp 60 40 50 50 50 50 50 50 50 50 50 5	om)	

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