

## **OIL ANALYSIS REPORT**

#### Sample Rating Trend



# VOLVO VNL 174 (S/N 4V4NC9EH8PN315470)

Diesel Engine

PETRO CANADA DURON SHP 10W30 (--- GAL)

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

### Fluid Condition

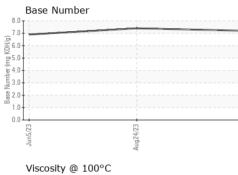
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

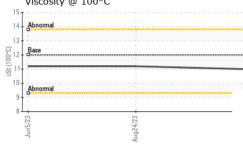
SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0097600	PCA0097446	PCA0097615
Sample Date		Client Info		24 Aug 2023	24 Aug 2023	05 Jun 2023
Machine Age	mls	Client Info		170000	200000	142000
Oil Age	mls	Client Info		28000	28000	0
Oil Changed		Client Info		Changed	N/A	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>6.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
,						
WEAR METAL		method	limit/base	current	history1	history2
Iron	ppm		>100	16	16	19
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	0	<1
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m		0	0	0
Aluminum	ppm	ASTM D5185m	>25	3	2	1
Lead	ppm		>40	<1	<1	<1
Copper	ppm	ASTM D5185m	>330	4	4	7
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 1	history1 0	history2 2
	ppm ppm					
Boron		ASTM D5185m	2	1	0	2
Boron Barium	ppm	ASTM D5185m ASTM D5185m	2 0	1 0	0	2 2
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50	1 0 60	0 0 62	2 2 67
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0	1 0 60 <1	0 0 62 <1	2 2 67 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950	1 0 60 <1 915	0 0 62 <1 942	2 2 67 <1 935
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950 1050	1 0 60 <1 915 979	0 0 62 <1 942 1001	2 2 67 <1 935 1121
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995	1 0 60 <1 915 979 997	0 0 62 <1 942 1001 1014	2 2 67 <1 935 1121 1094
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180	1 0 60 <1 915 979 997 1196	0 0 62 <1 942 1001 1014 1224	2 2 67 <1 935 1121 1094 1299
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600	1 0 60 <1 915 979 997 1196 3198	0 0 62 <1 942 1001 1014 1224 3313	2 2 67 <1 935 1121 1094 1299 3554
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600	1 0 60 <1 915 979 997 1196 3198 current	0 0 62 <1 942 1001 1014 1224 3313 history1	2 2 67 <1 935 1121 1094 1299 3554 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	2 0 50 950 1050 995 1180 2600 <b>limit/base</b> >25	1 0 60 <1 915 979 997 1196 3198 current 4	0 0 62 <1 942 1001 1014 1224 3313 history1 4	2 2 67 <1 935 1121 1094 1299 3554 history2 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	2 0 50 950 1050 995 1180 2600 <b>limit/base</b> >25	1 0 60 <1 915 979 997 1196 3198 current 4 <	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1	2 2 67 <1 935 1121 1094 1299 3554 history2 4 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600 <b>limit/base</b> >25	1 0 60 <1 915 979 997 1196 3198 current 4 <1 3	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1 2	2 2 67 <1 935 1121 1094 1299 3554 history2 4 0 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>Imit/base</b> >25 >20 <b>Imit/base</b> >3	1 0 60 <1 915 979 997 1196 3198 current 4 <1 3 3	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1 2 history1	2 2 67 <1 935 1121 1094 1299 3554 history2 4 0 4 0 4 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>Imit/base</b> >25 >20 <b>Imit/base</b> >3	1 0 60 <1 915 979 997 1196 3198 <u>current</u> 4 <1 3 <u>current</u> 0.4	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1 2 history1 0.4	2 2 67 <1 935 1121 1094 1299 3554 history2 4 0 4 0 4 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 950 1050 995 1180 2600 <i>imit/base</i> >25 >20 <i>imit/base</i> >3 >20	1 0 60 <1 915 979 997 1196 3198 <i>current</i> 4 <1 3 <i>current</i> 0.4 8.8	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1 2 history1 0.4 8.4	2 2 67 <1 935 1121 1094 1299 3554 history2 4 0 4 0 4 0 4 0 4 8.7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	2 0 50 0 950 1050 995 1180 2600 <b>imit/base</b> >25 <b>imit/base</b> >3 >20	1 0 60 <1 915 979 997 1196 3198 <i>current</i> 4 <1 3 <i>current</i> 0.4 8.8 18.9 <i>current</i>	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1 2 history1 0.4 8.4 18.9 history1	2 2 67 <1 935 1121 1094 1299 3554 <b>history2</b> 4 0 4 0 4 <b>history2</b> 0.4 8.7 20.8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	2 0 0 50 0 950 1050 995 1180 2600 2600 25 20 220 20 20 20 20 20 20 20 20 20 20 20	1 0 60 <1 915 979 997 1196 3198 <u>current</u> 4 <1 3 <u>current</u> 0.4 8.8 18.9	0 0 62 <1 942 1001 1014 1224 3313 history1 4 <1 2 history1 0.4 8.4 18.9	2 2 67 <1 935 1121 1094 1299 3554 history2 4 0 4 0 4 0 4 0 4 8.7 20.8 history2



## **OIL ANALYSIS REPORT**

VISUAL





	VISUAL		methoa	limit/base	current	nistory i	riistory2
	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Aug24/23	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Aug24/23 Aug24/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
	Free Water	scalar	*Visual		NEG	NEG	NEG
	FLUID PROPE	ERTIES	method	limit/base	current	history1	history2
	Visc @ 100°C	cSt	ASTM D445	12.00	11.0	11.2	11.2
	GRAPHS						
	Ferrous Alloys						
2	20 iron						
Aug24/23	15 - nickel						
Au							
	<u>ق</u> 10						
	5-						
	0	······					
	Jun5/23	Aug24/23		Aug24/23			
	٦٢	Aug		Aug			
	Non-ferrous Meta	ils					
	copper						
	8 - Research lead						
	udd	1					
	4						
	2-						
	0						
	Jun5/23	Aug24/23		Aug24/23			
	٦٢	Aug		Aug			
	Viscosity @ 100°	С			Base Number		
	<sup>15</sup>			8.0			
	14 - Abnormal			7.0	1		
	13			(B/HOX) 5.1 HOX but 14.1 unp mn 3.1	0		
	0 12 - <b>Base</b>			¥_5.1	0		
	0 12 - Base 0 12 - Base 3 11				0		
	10			N 3.0	0+		
	Abnormal			8 2.1	1		
					1		
	5/23	‡/23				1/23 -	
	Jun5/23	Aug24/23		Aug24/23	Jun5/23	Aug24/23	
Laboratory Sample No.		501 Madis Received Diagnose	<b>d</b> : 06 0	ry, NC 2751: Oct 2023 Oct 2023	3	1391	A REPAIR LI 5 W ROUTE PLAINFIELD,
Lab Number Unique Number	<b>r</b> : 10683904	Diagnost	t <b>ician</b> : We	s Davis		Contact. IOCL	US 605 ILIA HUBBAF
Lab Number	r : 10683904 e : FLEET	Diagnost				Contact: JOSH	