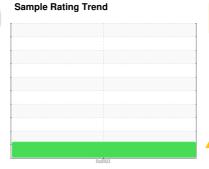


OIL ANALYSIS REPORT

MANCHESTER AIRPORT AP30 DRIVE [79745SM] **VOLVO PENTA 2011481336 - VARIABLE SPEED**

Center Diesel Engine

VOLVO PENTA SAE 15W40 (10 GAL)





DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Metal levels are typical for a new component breaking in.

Contamination

Light fuel dilution occurring.

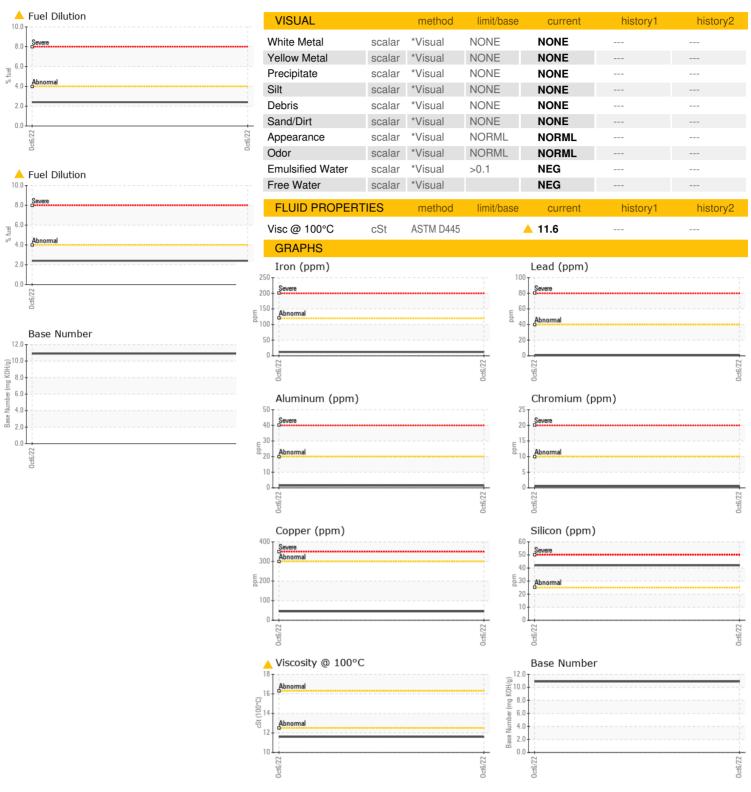
▲ Fluid Condition

The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

Sample Number Client Info VPA048398					Oct2022			
Client Info N/A	SAMPLE INFORM	NATION	method	limit/base	current	history1	history2	
Machine Age	Sample Number		Client Info		VPA048398			
Oil Age hrs Client Info 236 Oil Changed Client Info N/A Sample Status ATTENTION CONTAMINATION method limit/base current history1 history2 Glycol WC Method NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 12 Chromium ppm ASTM D5185m >10 <1 Nickel ppm ASTM D5185m >5 <1 Alluminum ppm ASTM D5185m >20 1 Lead ppm ASTM D5185m >20 1 Copper ppm ASTM D5185m >10 2 Vanadium ppm ASTM D5185m	Sample Date		Client Info		06 Oct 2022			
Coli Changed Colient Info N/A ATTENTION CONTAMINATION method limit/base current history1 history2 history2 current history1 history2 method limit/base current history1 history2 method limit/base current history1 history2 limit history2 limit history2 limit history2 limit history2 limit history2 limit history3 history2 limit history4 history4 history4 history4 history4 history4 history4 history4 history5 history6 limit/base current history1 history6 history6 history6 history8 history8	Machine Age	hrs	Client Info		236			
CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		236			
CONTAMINATION method limit/base current history1 history2	Oil Changed		Client Info		N/A			
WEAR METALS	Sample Status				ATTENTION			
WEAR METALS	CONTAMINATION	V	method	limit/base	current	history1	history2	
Iron	Glycol		WC Method		NEG			
Chromium ppm ASTM D5185m >10 <1 Nickel ppm ASTM D5185m >5 <1	WEAR METALS		method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>120	12			
Description	Chromium	ppm	ASTM D5185m	>10	<1			
Silver	Nickel	ppm	ASTM D5185m	>5	<1			
Aluminum	Titanium	ppm	ASTM D5185m		0			
Aluminum	Silver	ppm	ASTM D5185m	>5	<1			
Copper ppm ASTM D5185m >300 45 Tin ppm ASTM D5185m >10 2 Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 48 Manganese ppm ASTM D5185m 2 Magnesium ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 1068 Phosphorus ppm ASTM D5185m 1299	Aluminum	ppm	ASTM D5185m	>20	1			
Copper ppm ASTM D5185m >300 45 Tin ppm ASTM D5185m >10 2 Vanadium ppm ASTM D5185m 0 Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 48 Manganese ppm ASTM D5185m 2 Manganesium ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 1068 Zinc ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 25	Lead	ppm	ASTM D5185m	>40	<1			
Tin ppm ASTM D5185m >10 2	Copper	ppm	ASTM D5185m	>300	45			
Cadmium ppm ASTM D5185m 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 48 Manganese ppm ASTM D5185m 2 Magnesium ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 13339 Phosphorus ppm ASTM D5185m 1299 Zinc ppm ASTM D5185m 4355 Sulfur ppm ASTM D5185m 25 42 CONTAMINANTS method limit/base current history1 history2 Sodium ppm ASTM D5185m >25		ppm	ASTM D5185m	>10	2			
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 48 Magnese ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 1339 Phosphorus ppm ASTM D5185m 1068 Sulfur ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m 1068 INFRA-RED method limit/base current history1 history2 INFRA-RED method limit/base current history1 history2 Soot % 'ASTM D7844 0.1 Sulfation Abs/.1mm 'ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Poxidation Abs/.1mm 'ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm 'ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm 'ASTM D7414 >25 15.6	Vanadium		ASTM D5185m		0			
Boron ppm ASTM D5185m 0	Cadmium	ppm	ASTM D5185m		0			
Barium ppm ASTM D5185m 0 Molybdenum ppm ASTM D5185m 48 Manganese ppm ASTM D5185m 779 Magnesium ppm ASTM D5185m 1339 Calcium ppm ASTM D5185m 1068 Phosphorus ppm ASTM D5185m 1299 Zinc ppm ASTM D5185m 4355 Sulfur ppm ASTM D5185m >25 42 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m >20 3 Potassium ppm ASTM D5185m >20 3 Fuel %	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum ppm ASTM D5185m 48 Manganese ppm ASTM D5185m 2 Magnesium ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 1339 Phosphorus ppm ASTM D5185m 1068 Zinc ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m >20 3 Potassium ppm ASTM D5185m >20 3 Fuel % ASTM D7844 0.1 Soot % % *ASTM D7844 <td>Boron</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>0</td> <td></td> <td></td>	Boron	ppm	ASTM D5185m		0			
Manganese ppm ASTM D5185m 2 Magnesium ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 1339 Phosphorus ppm ASTM D5185m 1068 Zinc ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m >20 3 Potassium ppm ASTM D5185m >20 3 Fuel % ASTM D5185m >20 3 Soot % % ASTM D5185m >20 3 Fuel %	Barium	ppm	ASTM D5185m		0			
Magnesium ppm ASTM D5185m 779 Calcium ppm ASTM D5185m 1339 Phosphorus ppm ASTM D5185m 1068 Zinc ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m >20 3 Potassium ppm ASTM D5185m >20 3 Fuel % ASTM D5185m >20 3 Fuel % ASTM D5185m >20 3 Fuel % ASTM D5185m >20 3 Fuel	Molybdenum	ppm	ASTM D5185m		48			
Calcium ppm ASTM D5185m 1339 Phosphorus ppm ASTM D5185m 1068 Zinc ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m <1	Manganese	ppm	ASTM D5185m		2			
Phosphorus ppm ASTM D5185m 1068 Zinc ppm ASTM D5185m 1299 Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m >20 3 Potassium ppm ASTM D5185m >20 3 Fuel % ASTM D5185m >20 3 Fuel % ASTM D3524 >4.0 2.4 Soot % % *ASTM D7844 0.1 Soot % % *ASTM D7624 >20 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 <th col<="" td=""><td>Magnesium</td><td>ppm</td><td>ASTM D5185m</td><td></td><td>779</td><td></td><td></td></th>	<td>Magnesium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>779</td> <td></td> <td></td>	Magnesium	ppm	ASTM D5185m		779		
Zinc	Calcium	ppm	ASTM D5185m		1339			
Sulfur ppm ASTM D5185m 4355 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m <1	Phosphorus	ppm	ASTM D5185m		1068			
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m <1	Zinc	ppm	ASTM D5185m		1299			
Silicon ppm ASTM D5185m >25 42 Sodium ppm ASTM D5185m <1 Potassium ppm ASTM D5185m >20 3 Fuel % ASTM D3524 >4.0 2.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Sulfur	ppm	ASTM D5185m		4355			
Sodium	CONTAMINANTS	;	method	limit/base	current	history1	history2	
Potassium ppm ASTM D5185m >20 3 Fuel % ASTM D3524 >4.0 ▲ 2.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Silicon	ppm	ASTM D5185m	>25	42			
Fuel % ASTM D3524 >4.0 ▲ 2.4 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Sodium	ppm	ASTM D5185m		<1			
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Potassium	ppm	ASTM D5185m	>20	3			
Soot % *ASTM D7844 0.1 Nitration Abs/cm *ASTM D7624 >20 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Fuel	%	ASTM D3524	>4.0	<u>^</u> 2.4			
Nitration Abs/cm *ASTM D7624 > 20 7.0 Sulfation Abs/.1mm *ASTM D7415 > 30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 15.6	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Soot %	%	*ASTM D7844		0.1			
Sulfation Abs/.1mm *ASTM D7415 >30 20.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.6	Nitration	Abs/cm	*ASTM D7624	>20	7.0			
Oxidation								
	FLUID DEGRADA	ATION	method	limit/base	current	history1	history2	
	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.6			
	Base Number (BN)	mg KOH/g			10.9			



OIL ANALYSIS REPORT







Laboratory Sample No. Lab Number

: WearCheck USA - 501 Madison Ave., Cary, NC 27513

Unique Number : 10169445

: VPA048398 : 05664876

Received : 12 Oct 2022 : 17 Oct 2022 Diagnosed

Diagnostician : Jonathan Hester

Test Package : MOB 1 (Additional Tests: FuelDilution, PercentFuel, TBN) To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

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US 04103

Contact: Cody Clemens cclemens@powerprodsys.com

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F: