



WEAR  
CONTAMINATION  
FLUID CONDITION

**ATTENTION**  
**NORMAL**  
**NORMAL**

Machine Id  
**VOLVO PENTA A394762**  
Component  
**Starboard Diesel Engine**  
Fluid  
**VOLVO VDS-4.5 Premium Motor Oil 15W40 (13 LTR)**

### RECOMMENDATION

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		<b>VPA048696</b>	VPA048821	VPA042468
Sample Date		Client Info		<b>22 Jun 2023</b>	06 Mar 2023	20 Sep 2022
Machine Age	hrs	Client Info		<b>1281</b>	1107	0
Oil Age	hrs	Client Info		<b>0</b>	180	10
Filter Age	hrs	Client Info		<b>0</b>	0	0
Oil Changed		Client Info		<b>Changed</b>	Changed	N/A
Filter Changed		Client Info		<b>Changed</b>	Changed	N/A
Sample Status				<b>ATTENTION</b>	NORMAL	NORMAL

### WEAR

The nickel level is abnormal. All other component wear rates are normal.

Iron	ppm	ASTM D5185m	>80	<b>25</b>	16	8
Chromium	ppm	ASTM D5185m	>6	<b>3</b>	3	<1
Nickel	ppm	ASTM D5185m	>2	<b>4</b>	2	<1
Titanium	ppm	ASTM D5185m	>2	<b>&lt;1</b>	<1	0
Silver	ppm	ASTM D5185m	>2	<b>0</b>	0	0
Aluminum	ppm	ASTM D5185m	>20	<b>14</b>	16	10
Lead	ppm	ASTM D5185m	>95	<b>6</b>	2	<1
Copper	ppm	ASTM D5185m	>85	<b>6</b>	4	<1
Tin	ppm	ASTM D5185m	>9	<b>&lt;1</b>	<1	0
Vanadium	ppm	ASTM D5185m		<b>0</b>	0	0
White Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE

### CONTAMINATION

There is no indication of any contamination in the oil.

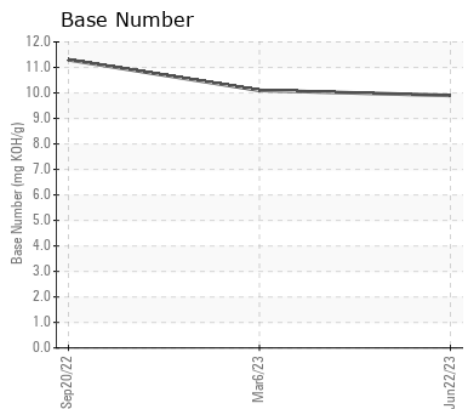
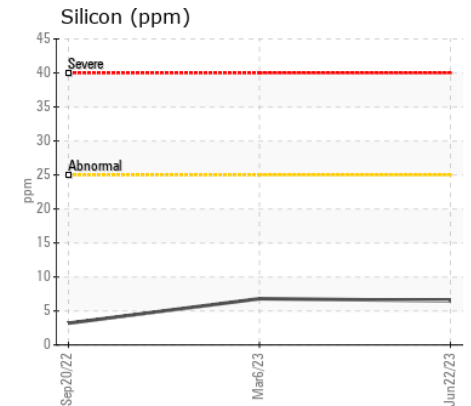
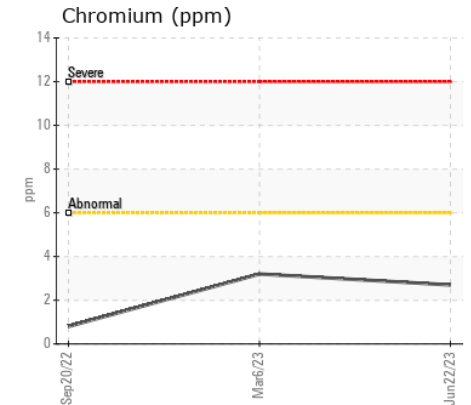
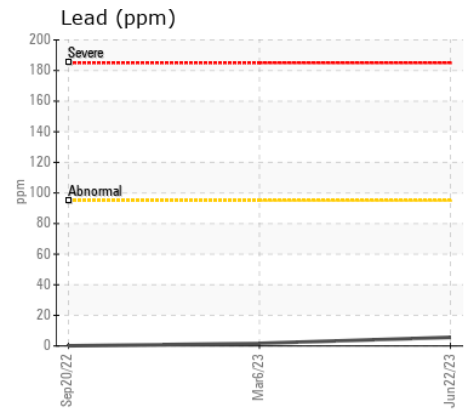
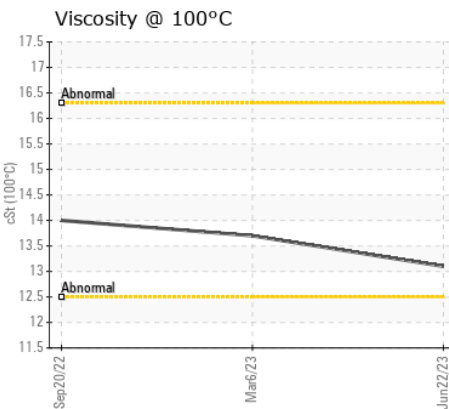
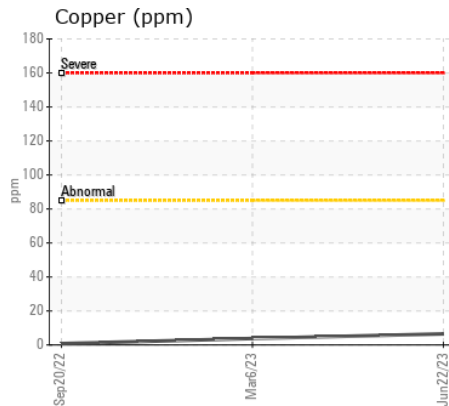
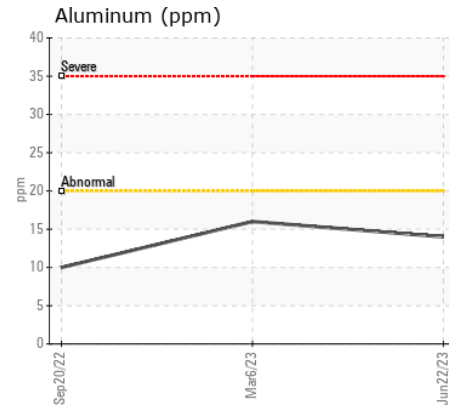
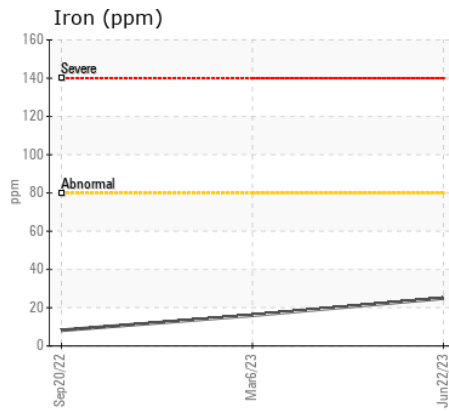
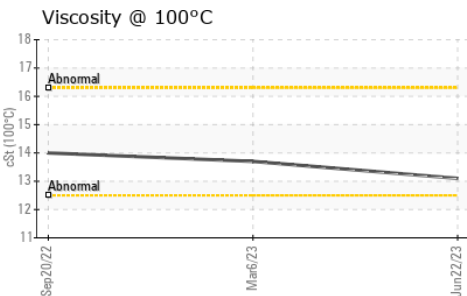
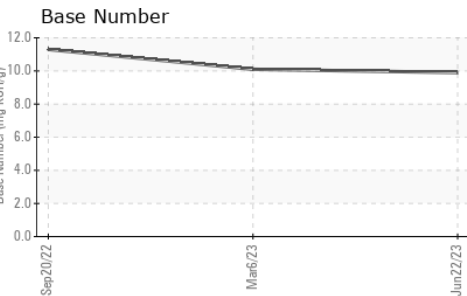
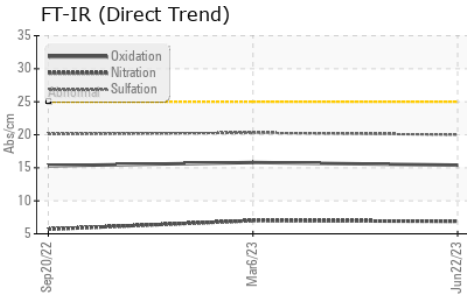
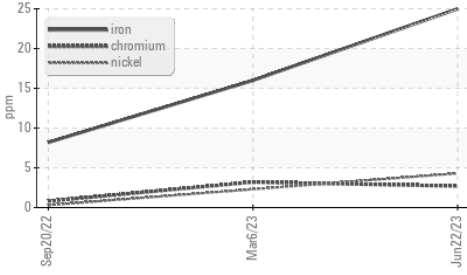
Silicon	ppm	ASTM D5185m	>25	<b>6</b>	7	3
Potassium	ppm	ASTM D5185m	>20	<b>3</b>	3	<1
Fuel		WC Method	>4.0	<b>&lt;1.0</b>	<1.0	<1.0
Water		WC Method	>0.1	<b>NEG</b>	NEG	NEG
Glycol		WC Method		<b>NEG</b>	NEG	NEG
Soot %	%	*ASTM D7844		<b>0.2</b>	0.2	0.1
Nitration	Abs/cm	*ASTM D7624	>20	<b>6.9</b>	7.0	5.7
Sulfation	Abs/.1mm	*ASTM D7415	>30	<b>20.0</b>	20.3	20.1
Silt	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Debris	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Appearance	scalar	*Visual	NORML	<b>NORML</b>	NORML	NORML
Odor	scalar	*Visual	NORML	<b>NORML</b>	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	<b>NEG</b>	NEG	NEG

### FLUID CONDITION

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

Sodium	ppm	ASTM D5185m		<b>3</b>	3	1
Boron	ppm	ASTM D5185m		<b>2</b>	12	15
Barium	ppm	ASTM D5185m		<b>&lt;1</b>	<1	0
Molybdenum	ppm	ASTM D5185m		<b>56</b>	59	59
Manganese	ppm	ASTM D5185m		<b>&lt;1</b>	<1	<1
Magnesium	ppm	ASTM D5185m		<b>917</b>	954	840
Calcium	ppm	ASTM D5185m		<b>1027</b>	1153	1099
Phosphorus	ppm	ASTM D5185m		<b>936</b>	974	919
Zinc	ppm	ASTM D5185m		<b>1177</b>	1226	1101
Sulfur	ppm	ASTM D5185m		<b>3439</b>	3605	3314
Oxidation	Abs/.1mm	*ASTM D7414	>25	<b>15.4</b>	15.8	15.3
Base Number (BN)	mg KOH/g	ASTM D2896		<b>9.9</b>	10.1	11.3
Visc @ 100°C	cSt	ASTM D445		<b>13.1</b>	13.7	14.0

**Ferrous Alloys**



**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : VPA048696 **Received** : 28 Jun 2023  
**Lab Number** : 05885339 **Tested** : 28 Jun 2023  
**Unique Number** : 10535822 **Diagnosed** : 30 Jun 2023 - Don Baldrige  
**Test Package** : MOB 1 ( Additional Tests: TBN )

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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)