



WEAR	NORMAL
CONTAMINATION	ABNORMAL
FLUID CONDITION	ATTENTION

Area
NADINE URCIUOLI [ROSS]

Machine Id
VOLVO A220859

Component
Center Diesel Engine

Fluid
VOLVO 10W40 (--- GAL)

RECOMMENDATION

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		VPA021689	VPA015704	---
Sample Date		Client Info		08 May 2019	21 Aug 2017	---
Machine Age	hrs	Client Info		115	106	---
Oil Age	hrs	Client Info		45	36	---
Filter Age	hrs	Client Info		0	0	---
Oil Changed		Client Info		Not Changd	Not Changd	---
Filter Changed		Client Info		Not Changd	Not Changd	---
Sample Status				ABNORMAL	ABNORMAL	---

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>80	28	65	---
Chromium	ppm	ASTM D5185m	>6	<1	1	---
Nickel	ppm	ASTM D5185m	>2	0	<1	---
Titanium	ppm	ASTM D5185m	>2	<1	0	---
Silver	ppm	ASTM D5185m	>2	0	0	---
Aluminum	ppm	ASTM D5185m	>20	2	4	---
Lead	ppm	ASTM D5185m	>95	<1	1	---
Copper	ppm	ASTM D5185m	>85	4	13	---
Tin	ppm	ASTM D5185m	>9	2	9	---
Vanadium	ppm	ASTM D5185m		0	0	---
White Metal	scalar	*Visual	NONE	NONE	NONE	---
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	---

CONTAMINATION

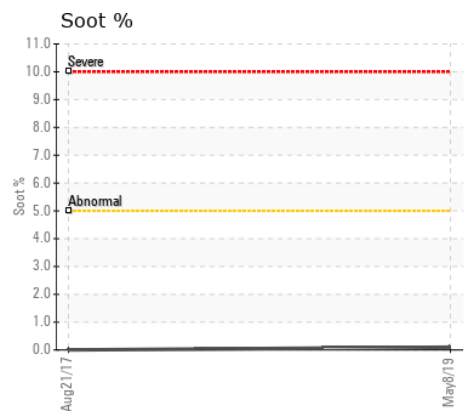
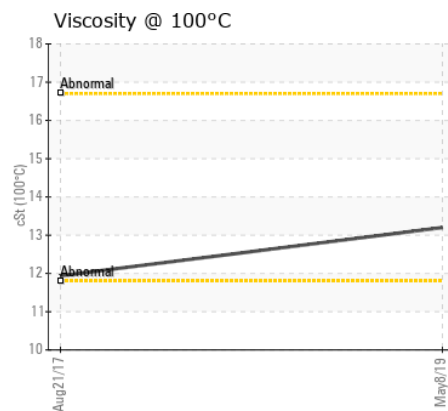
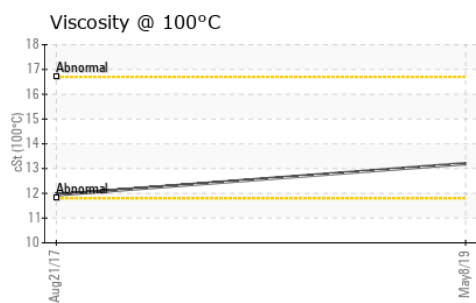
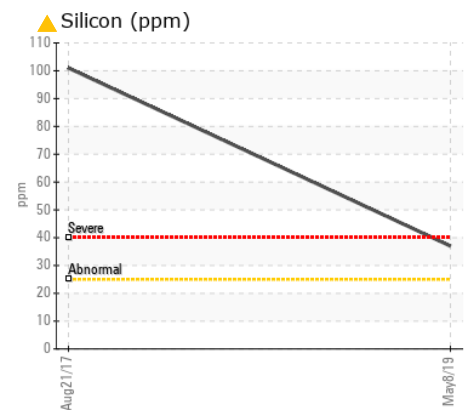
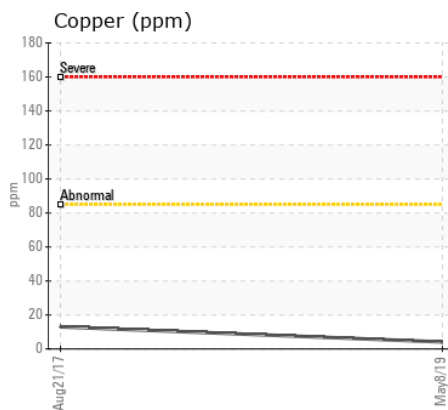
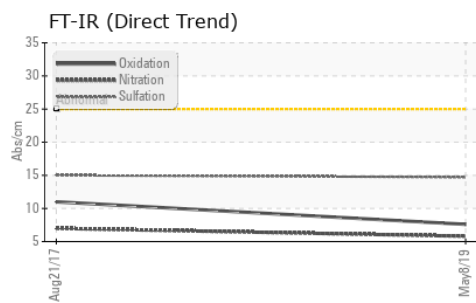
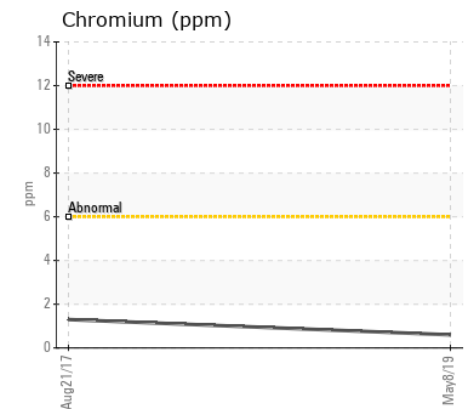
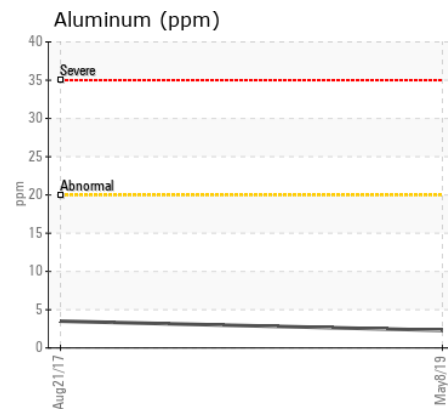
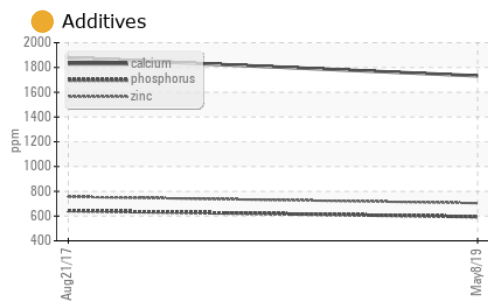
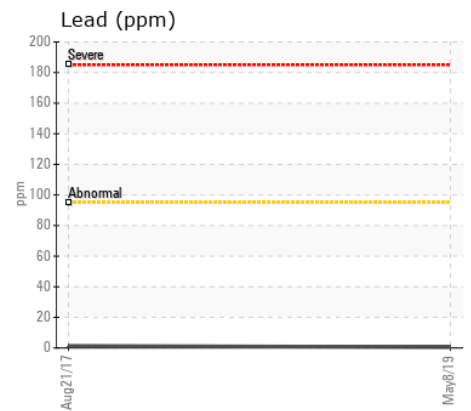
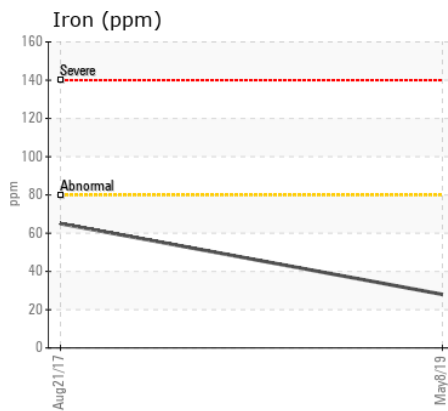
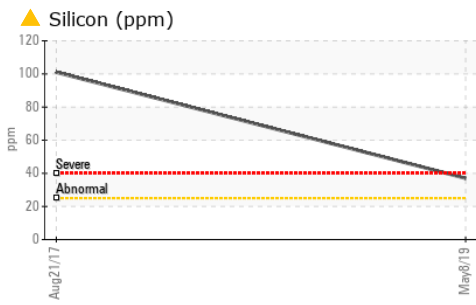
Elemental level of silicon (Si) above normal indicating ingress of seal material.

Silicon	ppm	ASTM D5185m	>25	▲ 37	▲ 101	---
Potassium	ppm	ASTM D5185m	>20	0	7	---
Fuel		WC Method	>4.0	<1.0	<1.0	---
Water		WC Method	>0.1	NEG	NEG	---
Glycol		WC Method		NEG	NEG	---
Soot %	%	*ASTM D7844		0.1	0	---
Nitration	Abs/cm	*ASTM D7624	>20	5.8	7.	---
Sulfation	Abs/.1mm	*ASTM D7415	>30	14.7	15.	---
Silt	scalar	*Visual	NONE	NONE	NONE	---
Debris	scalar	*Visual	NONE	NONE	NONE	---
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	---
Appearance	scalar	*Visual	NORML	NORML	NORML	---
Odor	scalar	*Visual	NORML	NORML	NORML	---
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	---

FLUID CONDITION

The condition of the oil is acceptable for the time in service.

Sodium	ppm	ASTM D5185m		2	5	---
Boron	ppm	ASTM D5185m		2	11	---
Barium	ppm	ASTM D5185m		0	0	---
Molybdenum	ppm	ASTM D5185m		38	40	---
Manganese	ppm	ASTM D5185m		1	4	---
Magnesium	ppm	ASTM D5185m		15	18	---
Calcium	ppm	ASTM D5185m		1732	1878	---
Phosphorus	ppm	ASTM D5185m		● 594	643	---
Zinc	ppm	ASTM D5185m		● 704	756	---
Sulfur	ppm	ASTM D5185m		● 1707	2234	---
Oxidation	Abs/.1mm	*ASTM D7414	>25	7.6	11.	---
Visc @ 100°C	cSt	ASTM D445		13.2	11.94	---



Certificate L2367

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

Sample No. : VPA021689

Lab Number : 04714579

Unique Number : 8601125

Test Package : MOB 1

Received : 15 May 2019

Tested : 16 May 2019

Diagnosed : 16 May 2019 - Don Baldrige

Helmuts Marine Service

619 Canal Street

SAN RAFAEL, CA

US 94901-3545

Contact: NADINE URUIOLI
SERVICE@HELMUTSMARINE.COM

T: x:

F: x:

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)