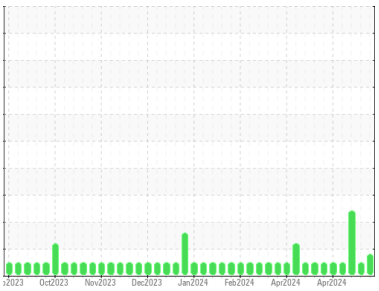
OIL ANALYSIS REPORT

Machine Id
CATERPILLAR GM01 - DA LUBRICANT BLUE FLAME HB-5 SAE 40 (S/N LGS00177)
Component
Biogas Engine
Fluid
D-A Lubricant Blue Flame HB-5 40W (140 GAL)

Sample Rating Trend



WEAR

DIAGNOSIS

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

Wear
An increase in the iron level is noted. All other 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 AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0880166**	WC0880165	WC0880164
Sample Date		Client Info		**28 May 2024**	20 May 2024	13 May 2024
Machine Age	hrs	Client Info		**80412**	80224	80060
Oil Age	hrs	Client Info		**352**	164	827
Oil Changed		Client Info		**Not Changd**	Changed	Not Changd
Sample Status				**MARGINAL**	NORMAL	ABNORMAL

CONTAMINATION		method	limit/base	current	history1	history2
Fuel		WC Method	>4.0	**<1.0**	<1.0	<1.0
Water		WC Method	>0.1	**NEG**	NEG	NEG
Glycol		WC Method		**NEG**	NEG	NEG

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>45	▲ **43**	14	15
Chromium	ppm	ASTM D5185m	>2	**2**	1	0
Nickel	ppm	ASTM D5185m	>2	**1**	<1	<1
Titanium	ppm	ASTM D5185m		**2**	2	<1
Silver	ppm	ASTM D5185m	>5	**0**	<1	0
Aluminum	ppm	ASTM D5185m	>10	**3**	2	2
Lead	ppm	ASTM D5185m	>5	**<1**	<1	<1
Copper	ppm	ASTM D5185m	>14	**5**	3	2
Tin	ppm	ASTM D5185m	>13	**3**	2	4
Vanadium	ppm	ASTM D5185m		**<1**	<1	0
Cadmium	ppm	ASTM D5185m		**<1**	<1	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		**7**	5	4
Barium	ppm	ASTM D5185m		**1**	0	0
Molybdenum	ppm	ASTM D5185m		**4**	3	2
Manganese	ppm	ASTM D5185m		**<1**	<1	<1
Magnesium	ppm	ASTM D5185m		**18**	13	17
Calcium	ppm	ASTM D5185m		**2608**	1737	1784
Phosphorus	ppm	ASTM D5185m		**489**	331	323
Zinc	ppm	ASTM D5185m		**577**	378	387
Sulfur	ppm	ASTM D5185m		**6366**	4416	5072

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>200	**158**	75	169
Sodium	ppm	ASTM D5185m		**1**	0	2
Potassium	ppm	ASTM D5185m	>20	**2**	1	1

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		**0.1**	0.1	0
Nitration	Abs/cm	*ASTM D7624	>20	**5.0**	4.6	5.2
Sulfation	Abs/.1mm	*ASTM D7415	>30	**20.8**	18.8	24.4

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	**11.4**	10.1	13.1
Acid Number (AN)	mg KOH/g	ASTM D8045		**1.29**	1.07	▲ 2.622
Base Number (BN)	mg KOH/g	ASTM D2896		**3.58**	4.06	▲ 2.58

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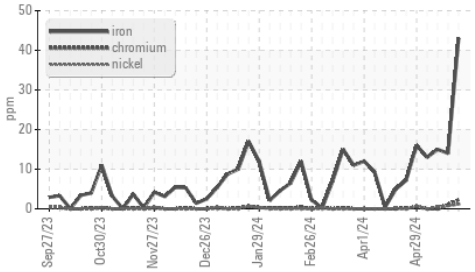
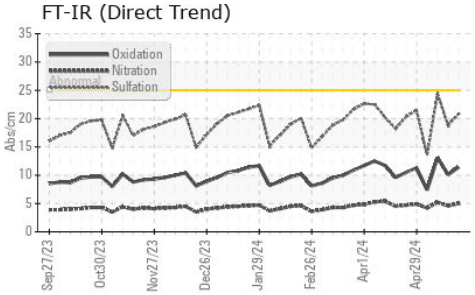
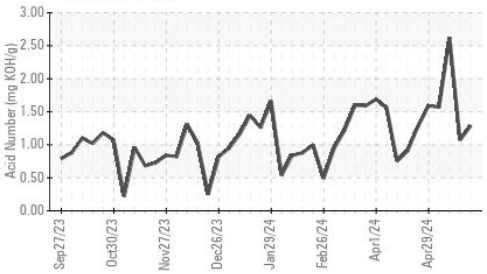
Ferrous Alloys



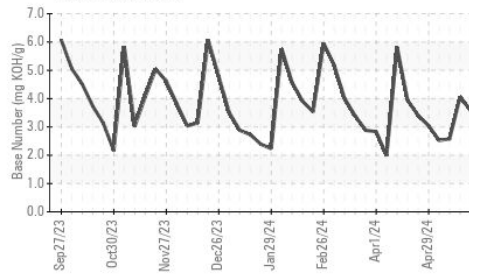
FT-IR (Direct Trend)



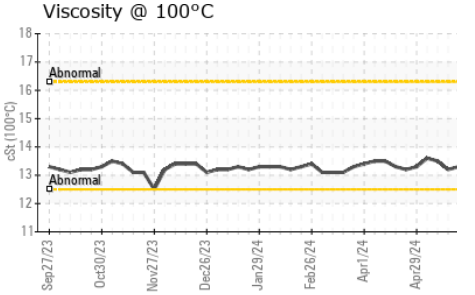
Acid Number



Base Number



Viscosity @ 100°C

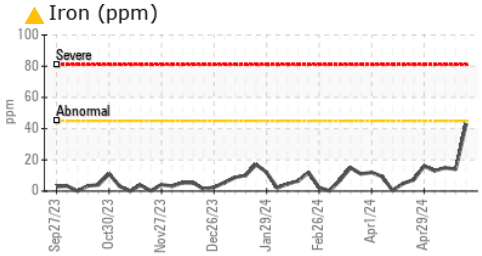


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Appearance	scalar	*Visual	NORML	**NORML**	NORML	NORML
Odor	scalar	*Visual	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	**NEG**	NEG	NEG
Free Water	scalar	*Visual		**NEG**	NEG	NEG

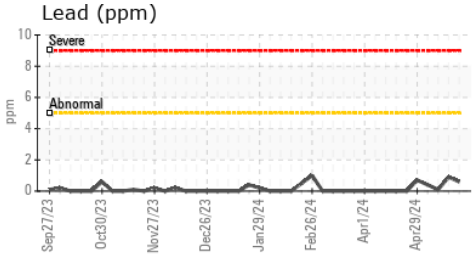
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445		**13.3**	13.2	13.5

GRAPHS

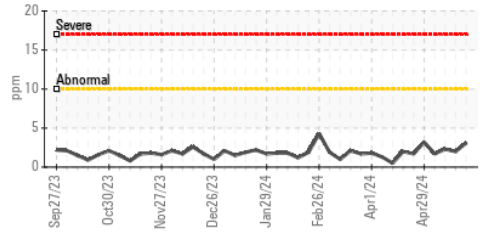
Iron (ppm)



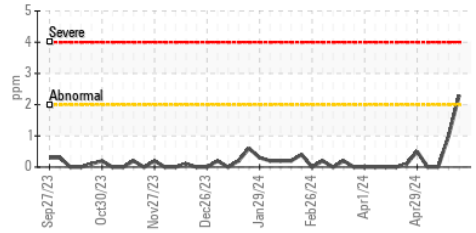
Lead (ppm)



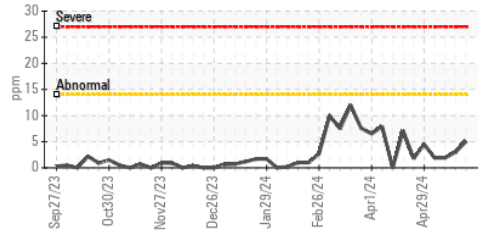
Aluminum (ppm)



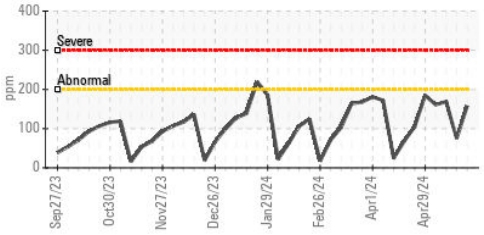
Chromium (ppm)



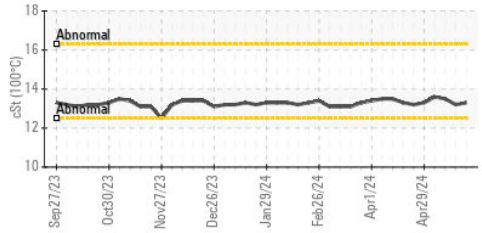
Copper (ppm)



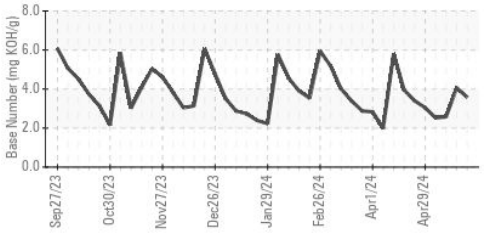
Silicon (ppm)



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0880166
Lab Number : 06194685
Unique Number : 11056808
Test Package : MOB 2

Received : 29 May 2024
Tested : 31 May 2024
Diagnosed : 31 May 2024 - Don Baldridge

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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Report Id: ONSJACNC [WUSCAR] 06194685 (Generated: 05/31/2024 12:54:34) Rev: 1

Submitted By: THOMAS BURTON