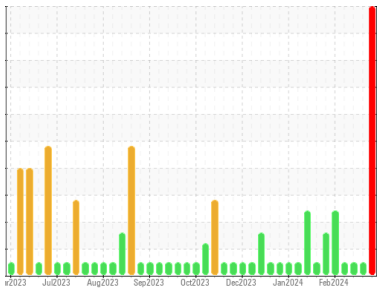
OIL ANALYSIS REPORT

Machine Id
Byron Center CAT 2 BYCM02BE
Component
Biogas Engine
Fluid
CHEVRON HDAX 9500 GAS ENGINE OIL 40 (--- GAL)

Sample Rating Trend



WEAR

DIAGNOSIS

Recommendation
We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition. (Customer Sample Comment: Final oil sample due to crank failure)

Wear
The iron level is severe. The aluminum level is severe. The tin level is abnormal.

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.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0640329**	WC0640328	WC0877091
Sample Date		Client Info		**02 Apr 2024**	25 Mar 2024	15 Mar 2024
Machine Age	hrs	Client Info		**107968**	107839	107576
Oil Age	hrs	Client Info		**573**	420	181
Oil Changed		Client Info		**N/A**	N/A	N/A
Sample Status				**SEVERE**	NORMAL	NORMAL

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

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>14	▲ **73**	3	0
Chromium	ppm	ASTM D5185m	>3	**0**	0	0
Nickel	ppm	ASTM D5185m		**0**	0	0
Titanium	ppm	ASTM D5185m		**<1**	0	0
Silver	ppm	ASTM D5185m		**0**	0	0
Aluminum	ppm	ASTM D5185m	>5	▲ **10**	2	1
Lead	ppm	ASTM D5185m	>8	**2**	2	2
Copper	ppm	ASTM D5185m	>5	**1**	<1	<1
Tin	ppm	ASTM D5185m	>3	▲ **3**	3	2
Vanadium	ppm	ASTM D5185m		**<1**	0	0
Cadmium	ppm	ASTM D5185m		**0**	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		**2**	2	2
Barium	ppm	ASTM D5185m		**0**	0	0
Molybdenum	ppm	ASTM D5185m		**1**	<1	<1
Manganese	ppm	ASTM D5185m		**2**	0	0
Magnesium	ppm	ASTM D5185m		**13**	16	13
Calcium	ppm	ASTM D5185m		**1720**	1777	1696
Phosphorus	ppm	ASTM D5185m		**231**	286	251
Zinc	ppm	ASTM D5185m		**314**	343	288
Sulfur	ppm	ASTM D5185m		**3158**	3554	2951

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>180	**122**	151	76
Sodium	ppm	ASTM D5185m	>20	**<1**	<1	1
Potassium	ppm	ASTM D5185m	>20	**0**	2	0

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		**0.1**	0	0
Nitration	Abs/cm	*ASTM D7624		**5.7**	5.6	5.3
Sulfation	Abs/.1mm	*ASTM D7415		**22.4**	23.6	19.2

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414		**12.9**	14.7	10.3
Acid Number (AN)	mg KOH/g	ASTM D8045	1.0	**1.22**	1.92	0.87
Base Number (BN)	mg KOH/g	ASTM D2896	5.4	**2.65**	2.42	3.57

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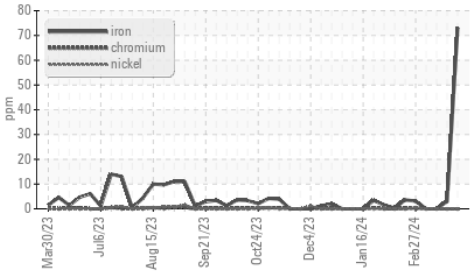
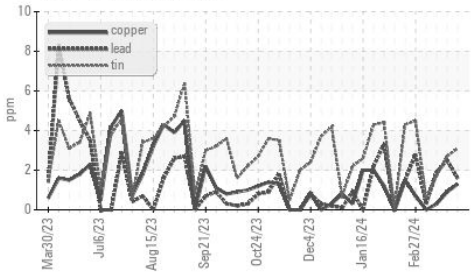
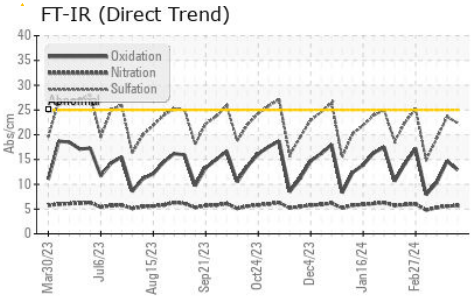
Ferrous Alloys



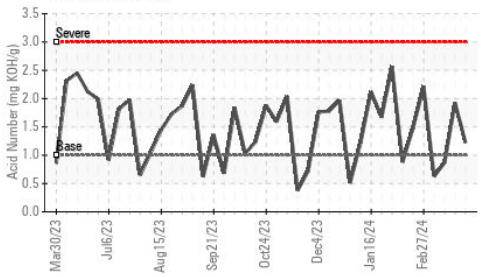
Non-ferrous Metals



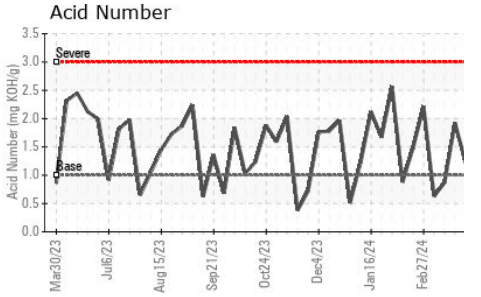
FT-IR (Direct Trend)



Acid Number



Acid Number

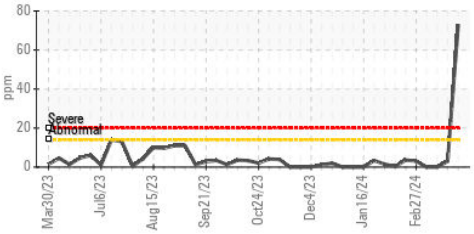


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt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

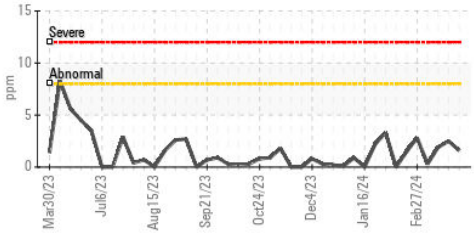
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	13.4	**13.5**	13.6	13.3

GRAPHS

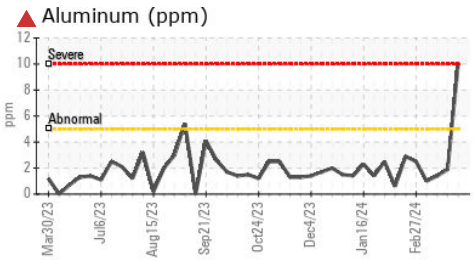
Iron (ppm)



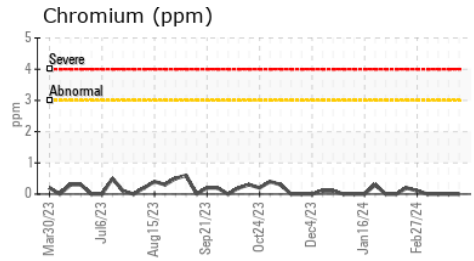
Lead (ppm)



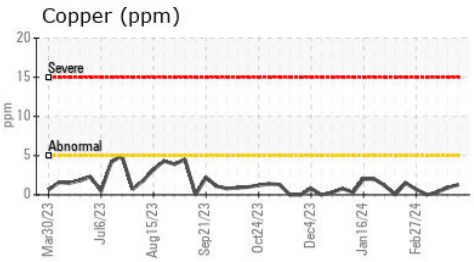
Aluminum (ppm)



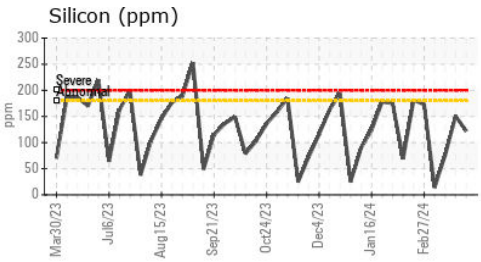
Chromium (ppm)



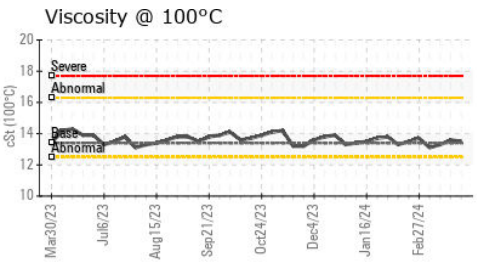
Copper (ppm)



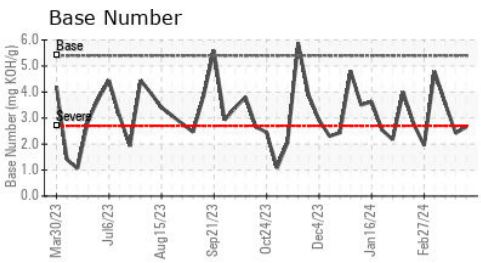
Silicon (ppm)



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0640329
Lab Number : 06138731
Unique Number : 10963539
Test Package : MOB 2

Received : 04 Apr 2024
Tested : 05 Apr 2024
Diagnosed : 06 Apr 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: EDLBYR [WUSCAR] 06138731 (Generated: 04/06/2024 13:00:54) Rev: 1

Submitted By: STEWART WESLEY