

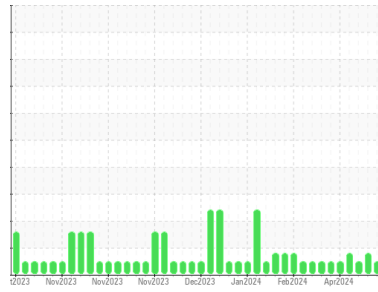


OIL ANALYSIS REPORT



Machine Id
CATERPILLAR GM02
 Component
Biogas Engine
 Fluid
D-A Lubricant Blue Flame HB-5 40W (--- GAL)

Sample Rating Trend



NORMAL



DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All 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			WC0870549	WC0870548	WC0870547
Sample Date	Client Info			17 Jun 2024	10 Jun 2024	04 Jun 2024
Machine Age	hrs	Client Info		68863	68772	68635
Oil Age	hrs	Client Info		22	148	12
Oil Changed	Client Info			N/A	N/A	Changed
Sample Status				NORMAL	ABNORMAL	NORMAL

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	18	▲ 58	31
Chromium	ppm	ASTM D5185m	>2	0	<1	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>10	<1	2	1
Lead	ppm	ASTM D5185m	>5	0	<1	0
Copper	ppm	ASTM D5185m	>14	0	2	0
Tin	ppm	ASTM D5185m	>13	0	1	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	<1	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		7	2	0
Barium	ppm	ASTM D5185m		0	0	<1
Molybdenum	ppm	ASTM D5185m		4	<1	0
Manganese	ppm	ASTM D5185m		0	<1	<1
Magnesium	ppm	ASTM D5185m		32	7	3
Calcium	ppm	ASTM D5185m		1397	1435	1417
Phosphorus	ppm	ASTM D5185m		330	395	366
Zinc	ppm	ASTM D5185m		400	477	437
Sulfur	ppm	ASTM D5185m		2924	2350	2159

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>200	23	82	26
Sodium	ppm	ASTM D5185m		<1	0	<1
Potassium	ppm	ASTM D5185m	>20	0	1	0

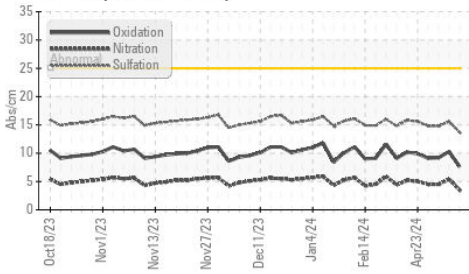
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		0	0.1	0
Nitration	Abs/cm	*ASTM D7624	>20	3.5	5.4	4.5
Sulfation	Abs/.1mm	*ASTM D7415	>30	13.7	15.6	14.8

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	7.6	10.3	9.2
Acid Number (AN)	mg KOH/g	ASTM D8045		0.48	0.16	0.47
Base Number (BN)	mg KOH/g	ASTM D2896		5.17	6.01	3.82

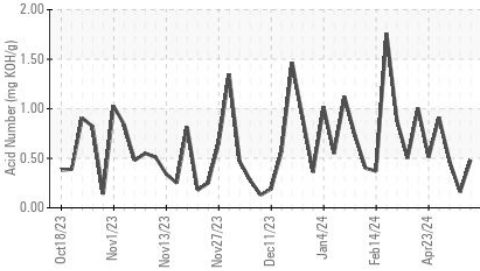


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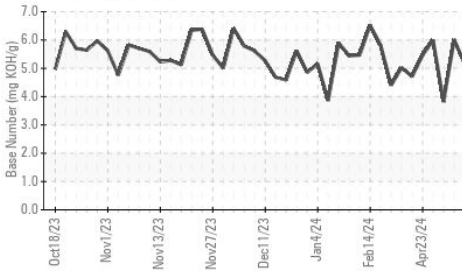
FT-IR (Direct Trend)



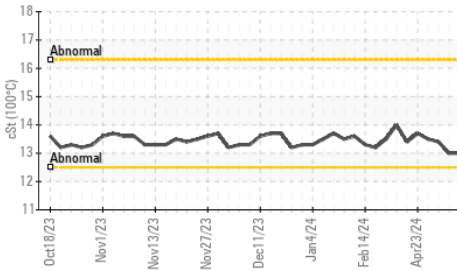
Acid Number



Base Number



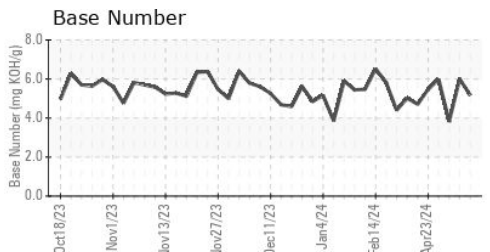
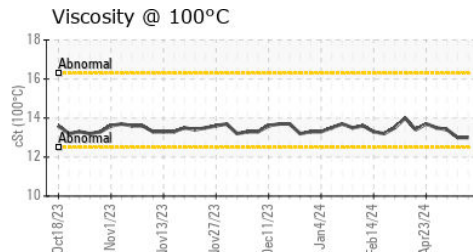
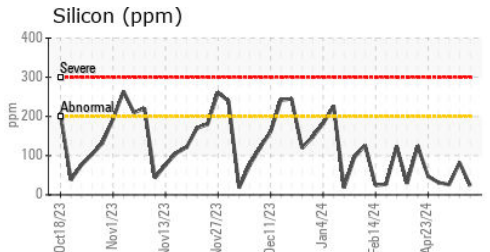
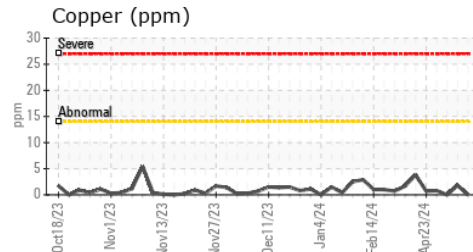
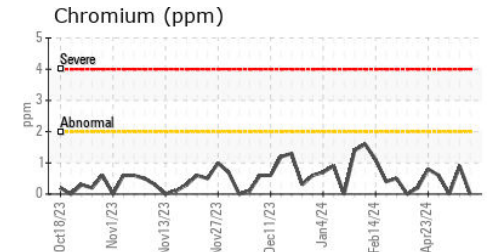
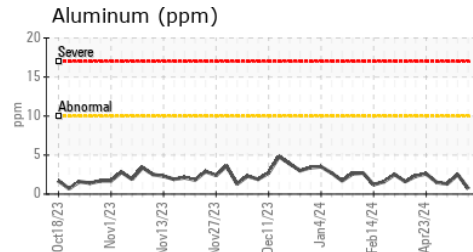
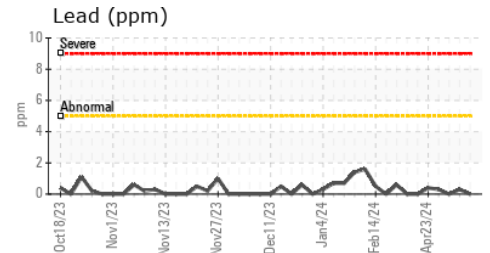
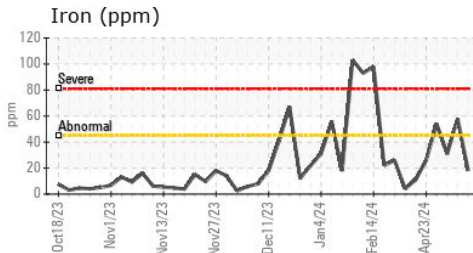
Viscosity @ 100°C



VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
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
Free Water	scalar	*Visual		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	13.0	13.0	13.4

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
 Sample No. : WC0870549
 Lab Number : 06213656
 Unique Number : 11086520
 Test Package : MOB 2

Received : 18 Jun 2024
 Tested : 20 Jun 2024
 Diagnosed : 20 Jun 2024 - Sean Felton

OAK GROVE KS
 1150 E 700TH AVE
 ARCADIA, KS
 US 66711

Contact: KALEB WEAVER
 kaleb.weaver@cubedistrictenergy.com

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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