

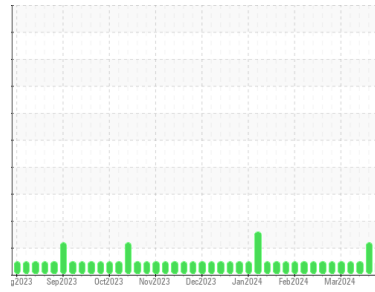


OIL ANALYSIS REPORT



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



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			WC0880159	WC0880158	WC0880157
Sample Date	Client Info			08 Apr 2024	07 Apr 2024	01 Apr 2024
Machine Age	hrs	Client Info		79234	79232	79069
Oil Age	hrs	Client Info		1	1008	845
Oil Changed	Client Info			Changed	Not Changd	Not Changd
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	<1	9	12
Chromium	ppm	ASTM D5185m	>2	0	0	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m		<1	1	1
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>10	<1	1	2
Lead	ppm	ASTM D5185m	>5	0	0	0
Copper	ppm	ASTM D5185m	>14	0	8	6
Tin	ppm	ASTM D5185m	>13	<1	3	3
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		4	2	4
Barium	ppm	ASTM D5185m		0	0	0
Molybdenum	ppm	ASTM D5185m		1	2	0
Manganese	ppm	ASTM D5185m		<1	<1	<1
Magnesium	ppm	ASTM D5185m		11	12	6
Calcium	ppm	ASTM D5185m		1662	1691	1827
Phosphorus	ppm	ASTM D5185m		282	266	303
Zinc	ppm	ASTM D5185m		347	349	372
Sulfur	ppm	ASTM D5185m		2534	3906	4965

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>200	24	172	181
Sodium	ppm	ASTM D5185m		2	2	2
Potassium	ppm	ASTM D5185m	>20	0	0	0

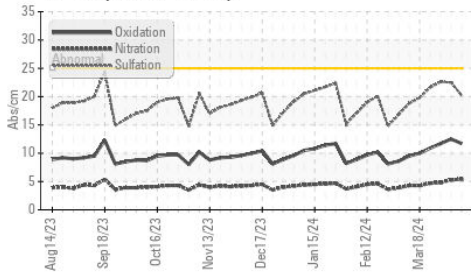
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		0	0	0
Nitration	Abs/cm	*ASTM D7624	>20	5.4	5.3	4.8
Sulfation	Abs/.1mm	*ASTM D7415	>30	20.2	22.5	22.6

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	11.7	12.5	11.7
Acid Number (AN)	mg KOH/g	ASTM D8045		0.752	1.56	1.69
Base Number (BN)	mg KOH/g	ASTM D2896		5.81	▲ 1.99	2.83

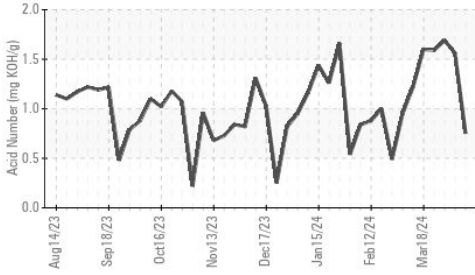


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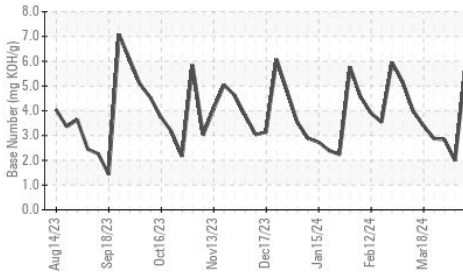
FT-IR (Direct Trend)



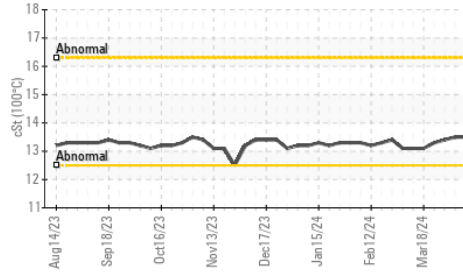
Acid Number



Base Number



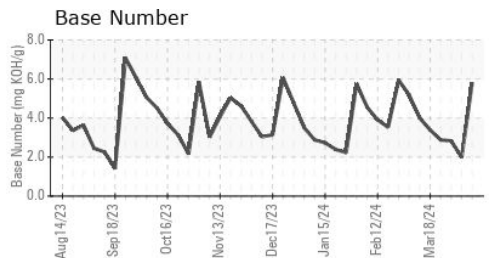
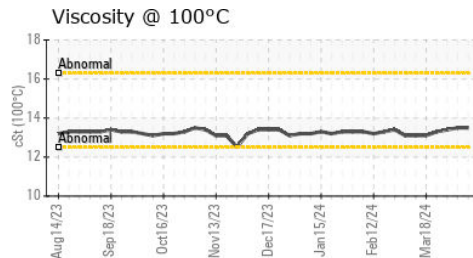
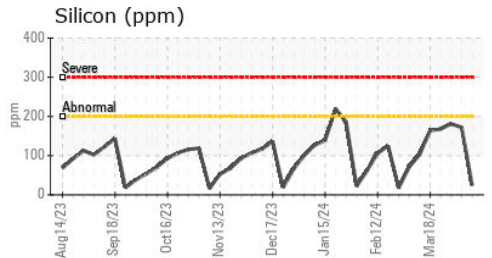
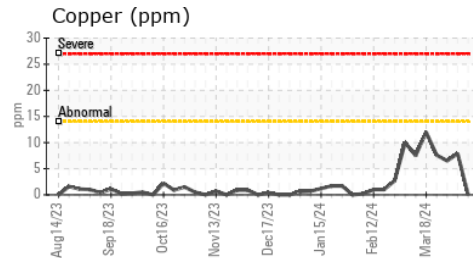
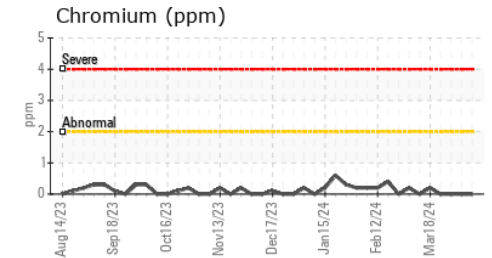
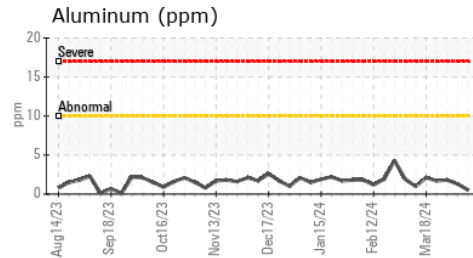
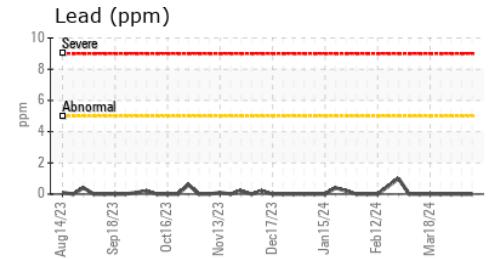
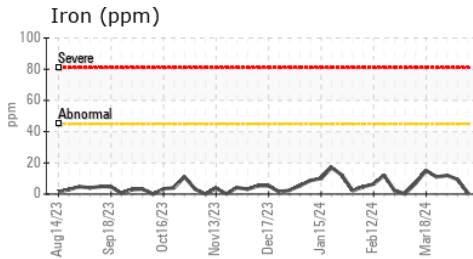
Viscosity @ 100°C



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	13.5	13.5	13.4

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
 Sample No. : WC0880159
 Lab Number : 06143249
 Unique Number : 10968057
 Test Package : MOB 2

Received : 09 Apr 2024
 Tested : 10 Apr 2024
 Diagnosed : 10 Apr 2024 - Jonathan Hester

ONSLow
 465 MEADOWVIEW RD
 JACKSONVILLE, NC
 US 28540

Contact: THOMAS BURTON
 thomas.burton@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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