

OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



LGS00181

Component

Middle Biogas Engine

CITGO PACEMAKER GAS ENGINE LFG LA 40 (--- GAL)

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.

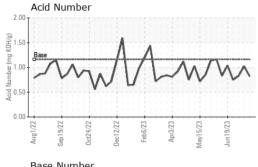
Fluid Condition

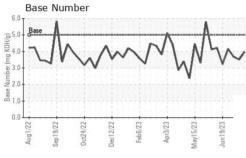
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

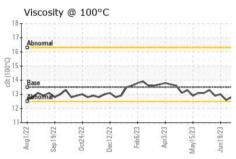
1 10 (GAL)				Feb2023 Apr2023 May2023		
SAMPLE INFORM	//ATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0803392	WC0803390	WC0803388
Sample Date		Client Info		17 Jul 2023	11 Jul 2023	03 Jul 2023
Machine Age	hrs	Client Info		61961	61833	61643
Oil Age	hrs	Client Info		86	464	275
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	V	method	limit/base	current	history1	history2
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>45	2	4	2
Chromium	ppm	ASTM D5185m	>2	0	<1	0
Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>5	<1	0	<1
Aluminum	ppm	ASTM D5185m	>10	2	4	<1
Lead	ppm	ASTM D5185m	>5	<1	<1	<1
Copper	ppm	ASTM D5185m	>14	<1	1	<1
Tin	ppm	ASTM D5185m	>13	1	4	2
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		<1	0	0
	ppiii	ASTIVI DSTOSIII		~ !	0	0
Barium	ppm	ASTM D5185m		<1	0	0
	• • •					
Barium	ppm	ASTM D5185m		<1	0	0
Barium Molybdenum	ppm	ASTM D5185m ASTM D5185m		<1 2	0 2	0 2
Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		<1 2 0	0 2 0	0 2 0
Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 2 0 11	0 2 0 12	0 2 0 11
Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 2 0 11 1553	0 2 0 12 1560	0 2 0 11 1558
Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 2 0 11 1553 303	0 2 0 12 1560 310	0 2 0 11 1558 308
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 2 0 11 1553 303 380	0 2 0 12 1560 310 408	0 2 0 11 1558 308 385
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base >200	<1 2 0 11 1553 303 380 2959	0 2 0 12 1560 310 408 3641	0 2 0 11 1558 308 385 3356
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 2 0 11 1553 303 380 2959 current	0 2 0 12 1560 310 408 3641 history1	0 2 0 11 1558 308 385 3356 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m		<1 2 0 11 1553 303 380 2959 current 80	0 2 0 12 1560 310 408 3641 history1	0 2 0 11 1558 308 385 3356 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	>200	<1 2 0 11 1553 303 380 2959 current 80 0	0 2 0 12 1560 310 408 3641 history1	0 2 0 11 1558 308 385 3356 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	>200 >20	<1 2 0 11 1553 303 380 2959 current 80 0 1	0 2 0 12 1560 310 408 3641 history1 188 0	0 2 0 11 1558 308 385 3356 history2 141 0 2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>200 >20 limit/base	<1 2 0 11 1553 303 380 2959 current 80 0 1 current	0 2 0 12 1560 310 408 3641 history1 188 0 1	0 2 0 11 1558 308 385 3356 history2 141 0 2 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>200 >20 limit/base	<1 2 0 11 1553 303 380 2959 current 80 0 1 current	0 2 0 12 1560 310 408 3641 history1 188 0 1 history1 0.1	0 2 0 11 1558 308 385 3356 history2 141 0 2 history2 0.1
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m	>200 >20 limit/base >20	<1 2 0 11 1553 303 380 2959 current 80 0 1 current 0 3.5	0 2 0 12 1560 310 408 3641 history1 188 0 1 history1 0.1 4.3	0 2 0 11 1558 308 385 3356 history2 141 0 2 history2 0.1 4.4
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m Method ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D76145	>200 >20 limit/base >20 >30	<1 2 0 11 1553 303 380 2959 current 80 0 1 current 0 3.5 15.8	0 2 0 12 1560 310 408 3641 history1 188 0 1 history1 0.1 4.3 19.1	0 2 0 11 1558 308 385 3356 history2 141 0 2 history2 0.1 4.4 17.5
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method *ASTM D7844 *ASTM D7624 *ASTM D7415 Method	>200 >20 limit/base >20 >20 limit/base	<1 2 0 11 1553 303 380 2959 current 80 0 1 current 0 3.5 15.8 current	0 2 0 12 1560 310 408 3641 history1 188 0 1 history1 0.1 4.3 19.1 history1	0 2 0 11 1558 308 385 3356 history2 141 0 2 history2 0.1 4.4 17.5 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA Oxidation	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method *ASTM D7844 *ASTM D7624 *ASTM D7415 Method *ASTM D7414	>200	<1 2 0 11 1553 303 380 2959 current 80 0 1 current 0 3.5 15.8 current 7.2	0 2 0 12 1560 310 408 3641 history1 188 0 1 history1 0.1 4.3 19.1 history1 9.1	0 2 0 11 1558 308 385 3356 history2 141 0 2 history2 0.1 4.4 17.5 history2 7.9



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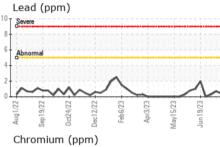


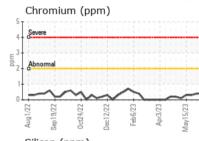


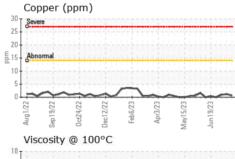
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	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

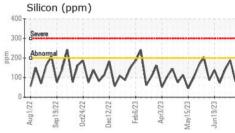
FLUID PROPER	THES	method			riistory i	History2
Visc @ 100°C	cSt	ASTM D445	13.5	12.7	13.0	12.8

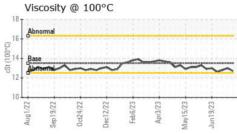
Severe						ШП	77
111111							
Abnormal	11111	1111			11:11	11111	
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Aug 1/22	Oct24/22	Dec12/22	Feb6/23	Apr3/23	May15/23	Jun19/23	
Sep	Oct	Dec	굔	Αp	Мау	Jin	
Aluminu	ım (pp	m)					
Severe		1177		11377			

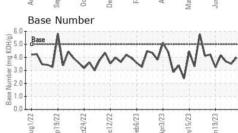














Certificate L2367

Report Id: BLAHARMO [WUSCAR] 05903899 (Generated: 07/31/2023 06:52:01) Rev: 1

Laboratory Sample No. Lab Number **Unique Number** Test Package : MOB 2

: WC0803392 : 05903899 : 10565255

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

: 20 Jul 2023 : 26 Jul 2023 Diagnosed Diagnostician : Doug Bogart

BLACK OAK 5054 HWY HH HARTVILLE, MO US 65667

Contact: CHIP MATHEWS chip.mattews@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)

Contact/Location: CHIP MATHEWS - BLAHARMO

T:

F: