

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend

## NORMAL



Component **Middle Biogas Engine** 

**CITGO PACEMAKER GAS ENGINE LFG LA 40** 

#### 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.

						V I	
40 ( GAL)		12022 Nov20	22 Dec2022 Mar2023	Apr2023 Jun2023 Jul2023	90000 Sep2023		
SAMPLE INFORM	<b>NATION</b>	method	limit/base	current	history1	history2	
Sample Number		Client Info		WC0803445	WC0803444	WC0803443	
Sample Date		Client Info		09 Oct 2023	02 Oct 2023	19 Sep 2023	
Machine Age	hrs	Client Info		58997	58951	58570	
Oil Age	hrs	Client Info		265	142	265	
Oil Changed		Client Info		N/A			
Sample Status				NORMAL	NORMAL	NORMAL	
CONTAMINATIO	N	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	0	0	4	
Chromium	ppm	ASTM D5185m	>2	0	0	<1	
Nickel	ppm	ASTM D5185m	>2	0	0	0	
Titanium	ppm	ASTM D5185m		0	0	0	
Silver	ppm	ASTM D5185m	>5	0	0	0	
Aluminum	ppm	ASTM D5185m	>10	1	1	4	
_ead	ppm	ASTM D5185m	>5	0	0	<1	
Copper	ppm	ASTM D5185m	>14	0	0	2	
Tin	ppm	ASTM D5185m	>13	2	2	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		2	<1	0	
Barium	ppm	ASTM D5185m		0	0	0	
Molybdenum	ppm	ASTM D5185m		2	<1	3	
Manganese	ppm	ASTM D5185m		0	0	1	
Viagnesium	ppm	ASTM DE185m		22	25	30	
Phosphorus	ppm	ASTM D5185m		1420	266	301	
Zinc	ppm	ASTM D5185m		365	362	349	
Sulfur	ppm	ASTM D5185m		2963	3097	3499	
CONTAMINANTS		method	limit/base	current	history1	history2	
Silicon	nom	ASTM D5185m	> 200	97	102	1/1	
Sodium	ppm	ASTM D5185m	>200	0	-1	141	
Potassium	ppm	ASTM D5185m	>20	ء <1	0	0	
		method	limit/base	ourrent	history1	history?	
	0/		iiiiii/base		nistory	nistory2	
SUOL %	% Abc/om	*ASTM D7604	> 20	U 2 0	27	0	
Sulfation	Abs/Cm Abs/1mm	*ASTM D7624	>20	3.9 16.2	3.7 16.8	3.9	
		metheel	/00	10.2	hister d	hiotem 0	
		method	iimit/base	current	nistory	nistory2	
Oxidation	Abs/.1mm	ASTM D7414	>25	7.3	7.5	8.2	
	mg KOH/g	ASTM D8045	1.16 F	0.87	0.93	0.88	
Dase Number (BN)	iiig KOH/g	NO 1 IVI D/2896	Э	3.62	3.4∠	J.40	



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	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
A	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
3/23 9/23 9/23 5/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Mari Juni Juli Ser	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
	Free Water	scalar	*Visual		NEG	NEG	NEG
~ A	FLUID PROPERT	IES	method	limit/base	current	history1	history2
- WW-	Visc @ 100°C	cSt	ASTM D445	13.5	13.0	13.0	13.1
V V	GRAPHS						
	Iron (ppm)				Lead (ppm)		
				10	Severe		
3/23 9/23 4/23	80 - Severe				3		
Marl Jun1 Jul2 Sep	5 60 Abnormal			E	Abnormal		
C	40-			đ,			
	20						~
		23	23			23 23 23	
	0ct3/ lov21/ lec26/	Apr24/	un 19, Jul24,	5	0ct3/ lov21/	Aar13/ Apr24/ un19/	Jul24/ Sep5/
	Aluminum (nnm)	-			Chromium (nn		
mant	20 Severe						
	15-				+ - Severe		
	E 10 - Abnormal			E	3		
ar13/2 n19/2 ul24/2 sep5/2	<u> </u>			£.2			
Ar Juu S	m	~~~		$\wedge$	1	$\sim$	
	22 23	23	23	( <u> </u>		23 23 23	23 23
	0ct3 Nov21 Dec26 Mar13	Apr24	Jun19 Jul24 Sen5	2	0ct3 Nov21 Dec26	Mar13 Apr24 Jun19	Jul24 Sep5
	Copper (ppm)		,		Silicon (ppm)	-	
	<sup>30</sup> Severe		12000020000	400	, I i i i i i i i i i i i i i i i i i i		
	25 -			300	Severe		
	E 15 - Abnormal			틀 200	Abnormal		
	10			100	INMM	ANN	11.1
	5					VVV ·	VV
	822 122 122 122	H/23	9/23 -		3/22 +	8/23 - 1/23 -	4/23 -
	0ct3 Nov21 Dec26 Mar13	Apr24	Jun19 Jul24		Dct3 Nov21 Dec26	Mar13 Apr24 Jun19	Jul24 Sep5
	Viscosity @ 100°C	8			Base Number		
	18				Base		
				B 5.0	I. Anl	Mr.	$\Lambda$
	Base			<u>الم</u> الم	wv v	V	~~~~
	Abnormal	~~	$\sim$	- EN 2.0	D <b>-</b>		
	10			80 1.0 80 0.0	) + · · · · · · · · · · · · · · · · · ·		
	3/22 6/22 3/23	4/23 -	9/23 - 4/23 -		3/22 1/22 6/22	3/23 - 4/23 - 9/23 -	4/23
	Oct Nov2 Dec2 Mar1	Apr2	Jul2 Sen		Oct Nov2 Dec2	Marl Apr2 Jun1	Jul2 Sep
l abavata	WaarChaak USA 5	01 Mad	oon Ave C-	NO OZET	0		
Laboratory Sample No	. wearCneck USA - 5 : WC0803445	ou i Madia Received	son Ave., Ca d • 16	ury, NG 27513 Oct 2023	5		5054 HWY HH
Lab Number	: 05979911	Diagnos	ed : 17	Oct 2023		н	ARTVILLE, MO
Unique Number	: 10697206	Diagnosi	tician : Sea	an Felton			US 65667
Certificate L2367 Test Package	: MOB 2	inn -1 -1 -1		n		Contact: Cl	HIP MATHEWS
<ul> <li>I O DISCUSS THIS SAMPLE REPORT,</li> <li>* - Denotes test methods that a</li> </ul>	contact Customer Servi are outside of the ISO 1	ce at 1-6 7025 scr	000-237-1369	a. litation	chip.mat	itews@cubedis	trictenergy.com
Statements of conformity to spec	cifications are based on the	he simple	acceptance	decision rule (	JCGM 106:2012)		F: