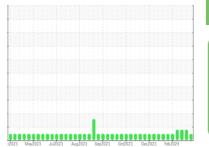


OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Machine Id **LGS00180**

Middle Biogas Engine

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

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

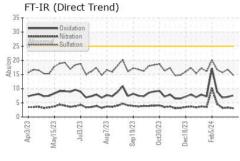
Fluid Condition

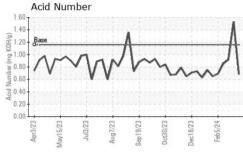
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

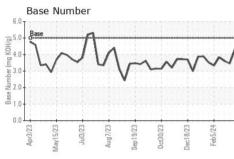
Sample Number Client Info WC0803471 WC0803467 Lead of 1569 24 May 2024	40 (GAL)		12023 Widy20	izs Juizozs Augzozs	36p2023 002023 D602023	1002027	
Sample Date Client Info 11 Jun 2024 28 May 2024 24 May 2024 26 Machine Age hrs Client Info 61691 61660 61559 61699	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 17 282 190	Sample Number		Client Info		WC0803471	WC0803467	WC0803466
Oil Age hrs Client Info 17 282 190 Oil Changed Client Info N/A N/A N/A N/A Sample Status Normal Normal NA N/A N/A CONTAMINATION method limit/base current history1 history1 Fuel WC Method 4-0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <t< td=""><td>Sample Date</td><td></td><td>Client Info</td><td></td><td>11 Jun 2024</td><td>28 May 2024</td><td>24 May 2024</td></t<>	Sample Date		Client Info		11 Jun 2024	28 May 2024	24 May 2024
Coli Changed Client Info N/A N/A N/A N/A N/A NORMAL ABNORMAL ABNORM	Machine Age	hrs	Client Info		61691		61569
NORMAL ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 history3	Oil Age	hrs	Client Info		17	282	190
NORMAL ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 history2	Oil Changed		Client Info		N/A	N/A	N/A
Fuel WC Method >4.0	-				NORMAL	ABNORMAL	ABNORMAL
Water WC Method >0.1 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >45 5 15 14 Chromium ppm ASTM D5185m >2 0 <1 1 Nickel ppm ASTM D5185m >2 0 3 4 Titanium ppm ASTM D5185m >2 0 0 <1 Silver ppm ASTM D5185m >5 0 0 1 Aluminum ppm ASTM D5185m >10 1 2 2 2 Lead ppm ASTM D5185m >10 1 2 2 2 Tin ppm ASTM D5185m >13 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	CONTAMINATIO	N	method	limit/base	current	history1	history2
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >45 5 15 14 Chromium ppm ASTM D5185m >2 0 <1	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >45 5 15 14 Chromium ppm ASTM D5185m >2 0 <1	Water		WC Method	>0.1	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >2 0 -1 1 Nickel ppm ASTM D5185m >2 0 4 3 4 Titanium ppm ASTM D5185m >2 0 4 3 4 Silver ppm ASTM D5185m >5 0 0 1 2 2 Aluminum ppm ASTM D5185m >5 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>45	5	15	14
Description	Chromium	ppm	ASTM D5185m	>2	0	<1	1
Titanium ppm ASTM D5185m 0 0 <1 Silver ppm ASTM D5185m >5 0 0 1 Aluminum ppm ASTM D5185m >10 1 2 2 Lead ppm ASTM D5185m >5 0 <1	Nickel	ppm	ASTM D5185m	>2	0	A 3	<u> </u>
Silver ppm ASTM D5185m >5 0 0 1 Aluminum ppm ASTM D5185m >10 1 2 2 Lead ppm ASTM D5185m >5 0 <1	Titanium	ppm	ASTM D5185m		0	0	<1
Aluminum	Silver	ppm	ASTM D5185m	>5	0	0	1
Lead	Aluminum		ASTM D5185m	>10	1	2	2
Copper ppm ASTM D5185m >14 <1 2 2 Tin ppm ASTM D5185m >13 <1	Lead			>5	0		<1
Tin					<1		
Vanadium ppm ASTM D5185m <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1							
Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m <1							
Boron							
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 5 2 4 Manganese ppm ASTM D5185m <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 5 2 4 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 60 21 31 Calcium ppm ASTM D5185m 1653 1552 1328 Phosphorus ppm ASTM D5185m 325 307 284 Zinc ppm ASTM D5185m 403 390 337 Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 0 Nitration Abs/.1mm *A	Boron	ppm	ASTM D5185m		<1	0	0
Manganese ppm ASTM D5185m <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>0</td> <td>0</td> <td>0</td>	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 60 21 31 Calcium ppm ASTM D5185m 1653 1552 1328 Phosphorus ppm ASTM D5185m 325 307 284 Zinc ppm ASTM D5185m 403 390 337 Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/.1mm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 <	Molybdenum	ppm	ASTM D5185m		5	2	4
Magnesium ppm ASTM D5185m 60 21 31 Calcium ppm ASTM D5185m 1653 1552 1328 Phosphorus ppm ASTM D5185m 325 307 284 Zinc ppm ASTM D5185m 403 390 337 Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/.1mm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 <	-	ppm	ASTM D5185m		<1	<1	<1
Calcium ppm ASTM D5185m 1653 1552 1328 Phosphorus ppm ASTM D5185m 325 307 284 Zinc ppm ASTM D5185m 403 390 337 Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 histo	-	ppm	ASTM D5185m		60	21	31
Phosphorus ppm ASTM D5185m 325 307 284 Zinc ppm ASTM D5185m 403 390 337 Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m >20 1 0 2 Potassium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 his	Calcium		ASTM D5185m		1653	1552	1328
Zinc ppm ASTM D5185m 403 390 337 Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m <1 <1 <1 <1 Potassium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/.mm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6	Phosphorus		ASTM D5185m		325	307	284
Sulfur ppm ASTM D5185m 3176 3756 3340 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m >20 1 <1 <1 <1 <1 <1 <1 <1 <1 <0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.			ASTM D5185m				
Silicon ppm ASTM D5185m >200 37 179 155 Sodium ppm ASTM D5185m <1 <1 <1 <1 Potassium ppm ASTM D5185m >20 1 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92							
Sodium ppm ASTM D5185m <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	CONTAMINANTS	8	method	limit/base	current	history1	history2
Sodium ppm ASTM D5185m <1 <1 <1 <1 <1 <1 <1 <1 <1 <21 <1 <21 <1 <21 <1 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <22 <21 <21 <22 <22 <21 <21 <21 <22 <22 <21 <21 <22 <22 <21 <21 <22 <22 <23 <21 <23 <21 <22 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21 <21	Silicon	ppm	ASTM D5185m	>200	37	179	155
INFRA-RED	Sodium	ppm	ASTM D5185m		<1	<1	<1
Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92	Potassium	ppm	ASTM D5185m	>20	1	0	2
Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg K0H/g ASTM D8045 1.16 0.681 1.53 0.92	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 >20 3.1 3.3 3.2 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92	Soot %	%	*ASTM D7844		0	0	0.1
Sulfation Abs/.1mm *ASTM D7415 >30 14.9 16.8 15.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92		Abs/cm		>20			
Oxidation Abs/.1mm *ASTM D7414 >25 7.6 7.1 6.8 Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92							
Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92	FLUID DEGRADA	NOITA	method	limit/base	current	history1	history2
Acid Number (AN) mg KOH/g ASTM D8045 1.16 0.681 1.53 0.92	Oxidation	Abs/.1mm	*ASTM D7414	>25	7.6	7.1	6.8
	Base Number (BN)	mg KOH/g	ASTM D2896	5	4.30	3.46	3.61

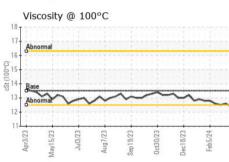


OIL ANALYSIS REPORT





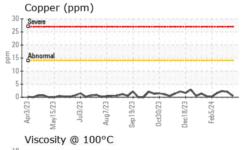


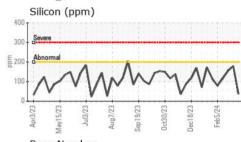


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

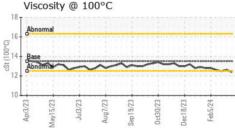
FLUID PROPER	TIES	method				history2
Visc @ 100°C	cSt	ASTM D445	13.5	12.4	12.6	12.5

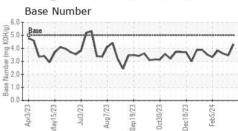
Severe					Severe 8
Abnormal					Abnormal
0				$\overline{}$	2
Apr3/23	Jul3/23 -	Sep19/23 -	Oct30/23	Feb5/24	Apr3/23
Aluminum (ppm)					Chromi
Severe					4 Severe





(ppm)









Certificate 12367

Laboratory Sample No.

: WC0803471 Lab Number : 06207990 Unique Number : 11075451 Test Package : MOB 2

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

Received : 12 Jun 2024 **Tested** : 19 Jun 2024 Diagnosed

: 19 Jun 2024 - Jonathan Hester

BLACK OAK 5054 HWY HH HARTVILLE, MO US 65667 Contact: CHIP MATHEWS

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)

chip.mattews@cubedistrictenergy.com

T:

F: