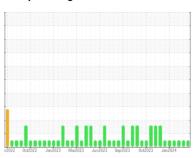


# **OIL ANALYSIS REPORT**

Sample Rating Trend



NORMAL



# 4EK05286

Component

**Biogas Engine** 

MAHLER Q8 Mahler G8 SAE 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.

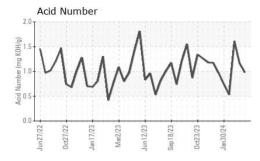
## **Fluid Condition**

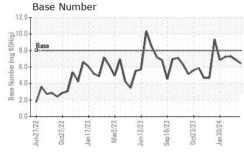
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service.

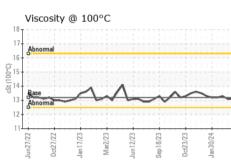
		nzuzz Uctzuz	z Janzuza Marzuza	Jun2023 Sep2023 Oct2023	POLICULY	
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0880274	WC0880276	WC0880268
Sample Date		Client Info		26 Mar 2024	20 Mar 2024	06 Mar 2024
Machine Age	hrs	Client Info		82239	82221	82015
Oil Age	hrs	Client Info		107	89	65
Oil Changed		Client Info		N/A	N/A	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	V	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	15	9	42
Chromium	ppm	ASTM D5185m	>2	1	<1	2
Nickel	ppm	ASTM D5185m	>2	<1	<1	2
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>5	0	<1	0
Aluminum	ppm	ASTM D5185m	>10	2	3	6
Lead	ppm	ASTM D5185m	>5	<1	<1	2
Copper	ppm	ASTM D5185m	>14	3	3	4
Tin	ppm	ASTM D5185m	>13	2	1	3
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		<1	0	0
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		0	0	<1
Boron Barium	ppm ppm	ASTM D5185m ASTM D5185m		0	0 2	<1
Barium	ppm	ASTM D5185m		0	2	0
Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m		0	2 <1	0
Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		0 1 <1	2 <1 <1	0 1 <1
Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		0 1 <1 6	2 <1 <1 5	0 1 <1 9
Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		0 1 <1 6 2156	2 <1 <1 5 2194	0 1 <1 9 3603
Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		0 1 <1 6 2156 386	2 <1 <1 5 2194 362	0 1 <1 9 3603 690
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	0 1 <1 6 2156 386 424	2 <1 <1 5 2194 362 424	0 1 <1 9 3603 690 745
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	0 1 <1 6 2156 386 424 3109	2 <1 <1 5 2194 362 424 3026	0 1 <1 9 3603 690 745 6048
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		0 1 <1 6 2156 386 424 3109 current	2 <1 <1 5 2194 362 424 3026 history1	0 1 <1 9 3603 690 745 6048
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m		0 1 <1 6 2156 386 424 3109 current	2 <1 <1 5 2194 362 424 3026 history1 58	0 1 <1 9 3603 690 745 6048 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	>200	0 1 <1 6 2156 386 424 3109 current 84	2 <1 <1 5 2194 362 424 3026 history1 58 0	0 1 <1 9 3603 690 745 6048 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	>200	0 1 <1 6 2156 386 424 3109 current 84 2	2 <1 <1 5 2194 362 424 3026 history1 58 0 2	0 1 <1 9 3603 690 745 6048 history2 196 1
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m  method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>200	0 1 <1 6 2156 386 424 3109 current 84 2 2	2 <1 <1 5 2194 362 424 3026 history1 58 0 2 history1	0 1 <1 9 3603 690 745 6048 history2 196 1 2
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	>200 >20 limit/base	0 1 <1 6 2156 386 424 3109 current 84 2 2 current 0	2 <1 <1 5 2194 362 424 3026 history1 58 0 2 history1 0	0 1 <1 9 3603 690 745 6048 history2 196 1 2 history2 0
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 ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m	>200 >20 limit/base >20	0 1 <1 6 2156 386 424 3109 current 84 2 2 current 0 4.6	2 <1 <1 5 2194 362 424 3026 history1 58 0 2 history1 0 4.5	0 1 <1 9 3603 690 745 6048 history2 196 1 2 history2 0 5.2
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 D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D5185m  ASTM D7844  *ASTM D7624  *ASTM D76145	>200 >20 limit/base >20 >30	0 1 <1 6 2156 386 424 3109 current 84 2 2 current 0 4.6 16.8	2 <1 <1 5 2194 362 424 3026 history1 58 0 2 history1 0 4.5 16.4	0 1 <1 9 3603 690 745 6048 history2 196 1 2 history2 0 5.2 17.6
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  ASTM D5185m  Method  *ASTM D7844  *ASTM D7624  *ASTM D7415  Method	>200 >20 limit/base >20 >30 limit/base	0 1 <1 6 2156 386 424 3109 current 84 2 2 current 0 4.6 16.8 current	2 <1 <1 5 2194 362 424 3026 history1 58 0 2 history1 0 4.5 16.4 history1	0 1 <1 9 3603 690 745 6048 history2 196 1 2 history2 0 5.2 17.6 history2



# **OIL ANALYSIS REPORT**



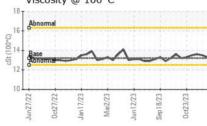


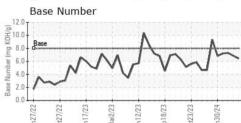


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

FLUID PROPER	THES	memod			riistory i	History2
Visc @ 100°C	cSt	ASTM D445	13.2	13.1	13.1	13.3

Visc @ 100°C	<b>13.1</b> 13.1 13.3
GRAPHS	
Iron (ppm)	Lead (ppm)
80 Severe	Severe
Abnomal	E Abnormal
20 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Jun 27,722 - Jun 17,723 - Jun 17,723 - Jun 12,723 - Sep 18,723 - Jun 12,723 - Jun 12,723 - Jun 20,724 - Jun 30,724 - Jun 3	Jun 27/22 Cot 27/22 Jan 17/23 Marz/23 Marz/23 Sep 18/23 Cot 23/23 - Jan 30/24
Aluminum (ppm)	Chromium (ppm)
Severe Severe	5
15	4 - Severe
E 10 Abnormal	E 2 Abnormal
5 ~~~~~	Marin
Jun27/22 - Oct27/22 - Jan17/23 - Jan17/23 - Sep 18/23 - Sep 18/23 - Jan30/24	Jun27/22 - Oct27/22 - Jun17/23 - Jun12/23 - Sep18/23 - Oct23/23 - Jun30/24
Copper (ppm)	Silicon (ppm)
30 T Severe	500 400
20	Smarra A
E 15 Abnomal	abnormal Abnormal
5 V - ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	100
Jun 27,722 - Oct 27,722 - Jun 17,23 - Jun 12,23 - Sep 18,23 - Jun 12,23 - Jun 12,24 - Jun	Jun27/22 - Oct27/22 - Jan17/23 - Jun12/23 - Sep 18/23 - Jun12/23 - Jan30/24 - Jan30/24 -
Viscosity @ 100°C	Base Number
Abnormal	\$12.0 \$10.0









Certificate L2367

Laboratory Sample No.

Lab Number : 06134198 Unique Number: 10953663 Test Package : MOB 2

: WC0880274

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 29 Mar 2024 **Tested** : 01 Apr 2024

Diagnosed : 03 Apr 2024 - Sean Felton

**BI-COUNTY** 3214 DOVER RD WOODLAWN, TN US 37191

Contact: KEVIN WEAVER

To discuss this sample report, contact Customer Service at 1-800-237-1369.

kevin.weaver@cubedistrictenergy.com T:

\* - 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)

F: