

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend

#### NORMAL

# LGS00178

Component

## **Biogas Engine**

#### MAHLER Q8 Mahler G8 SAE 40 (141 GAL)

#### 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.

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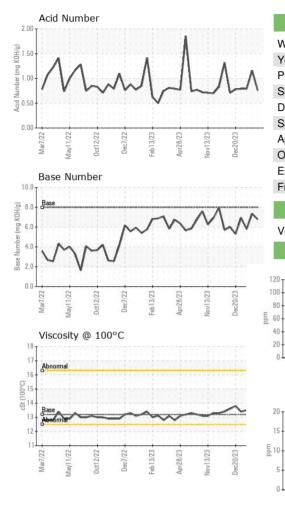


### 10000 May2022 0ct2022 Dec2022 Feb2023 Apr2023 Nov2023 Dec2023

SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0660921	WC0660922	WC0660923
Sample Date		Client Info		16 Jan 2024	11 Jan 2024	03 Jan 2024
Machine Age	hrs	Client Info		65903	65789	65595
Oil Age	hrs	Client Info		140	26	294
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	٧	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	0	0
Chromium	ppm	ASTM D5185m	>2	<1	0	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m		<1	0	0
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>10	2	2	2
Lead	ppm	ASTM D5185m	>5	<1	0	1
Copper	ppm	ASTM D5185m	>14	1	1	2
Tin	ppm	ASTM D5185m	>13	<1	0	1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current <1	history1 0	history2 <1
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	<1	0	<1
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	<1 1	0	<1 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 1 0	0 0 0	<1 0 0
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 1 0 0	0 0 0 <1	<1 0 0 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 1 0 0 6	0 0 <1 8	<1 0 0 <1 6
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 1 0 0 6 2126	0 0 <1 8 2101	<1 0 0 <1 6 2210
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 1 0 0 6 2126 495	0 0 <1 8 2101 433	<1 0 0 <1 6 2210 465
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 1 0 0 6 2126 495 508	0 0 <1 8 2101 433 510	<1 0 0 <1 6 2210 465 534
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm 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 1 0 6 2126 495 508 3754	0 0 <1 8 2101 433 510 2561	<1 0 0 <1 6 2210 465 534 3933
Boron 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	limit/base	<1 1 0 0 6 2126 495 508 3754 current	0 0 2 3 3 5 10 2561 history1	<1 0 0 <1 6 2210 465 534 3933 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	limit/base	<1 1 0 0 6 2126 495 508 3754 current 71	0 0 2 3 4 3 5 10 2 5 10 2 5 6 1 history1 2 1	<1 0 0 <1 6 2210 465 534 3933 history2 118
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	limit/base	<1 1 0 0 6 2126 495 508 3754 Current 71 0	0 0 0 <1 8 2101 433 510 2561 <b>history1</b> 21 0	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >200	<1 1 0 0 6 2126 495 508 3754 current 71 0 1	0 0 0 <1 8 2101 433 510 2561 history1 21 0 0 0	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0
Boron 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 ASTM D5185m	limit/base >200 >20 limit/base	<1 1 0 0 6 2126 495 508 3754  Current 71 0 1 Current	0 0 0 <1 8 2101 433 510 2561 <b>history1</b> 21 0 0 0 <b>history1</b>	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0 history2
Boron 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 ASTM D5185m	limit/base >200 >20 limit/base	<1 1 0 0 6 2126 495 508 3754  Current 71 0 1 Current 0	0 0 0 <1 8 2101 433 510 2561 history1 21 0 0 0 history1 0	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0 history2 0
Boron 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 ASTM D5185m	limit/base >200 imit/base >20	<1 1 0 0 6 2126 495 508 3754 Current 71 0 1 Current 0 5.2	0 0 0 <1 8 2101 433 510 2561 history1 21 0 0 0 history1 0 4.8	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0 history2 0 history2 0 5.4
Boron 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 ASTM D5185m	imit/base >200 >20 imit/base >20 imit/base	<1 1 0 0 0 6 2126 495 508 3754 Current 71 0 1 Current 0 5.2 17.1	0 0 0 <1 8 2101 433 510 2561 <b>history1</b> 21 0 0 0 <b>history1</b> 0 4.8 15.0	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0 history2 0 5.4 18.5
Boron 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 ASTM D7844 *ASTM D7624 *ASTM D7615	imit/base >200  imit/base  >20  imit/base	<1 1 0 0 0 6 2126 495 508 3754 Current 71 0 1 Current 0 5.2 17.1 current 9.3	0 0 0 3 3 1 8 2101 433 510 2561 <b>history1</b> 21 0 0 0 <b>history1</b> 0 4.8 15.0 <b>history1</b>	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0 history2 0 5.4 18.5 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA Oxidation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7624 *ASTM D7415	imit/base >200  imit/base  >20  imit/base	<1 1 0 0 0 6 2126 495 508 3754 Current 71 0 1 Current 0 5.2 17.1	0 0 0 3 3 1 8 2101 433 510 2561 <b>history1</b> 21 0 0 0 <b>history1</b> 0 4.8 15.0 <b>history1</b> 8.7	<1 0 0 <1 6 2210 465 534 3933 history2 118 <1 0 history2 0 5.4 18.5 history2 9.9



# **OIL ANALYSIS REPORT**



	VISUAL		method	limit/base	current	history1	history2
	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Α	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
NULL	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
eb 13/23 - 4pr28/23 - 1ov13/23 -	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Feb13/23 Apr28/23 Nov13/23 Dec20/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
1000020002000200020002000	Free Water	scalar	*Visual		NEG	NEG	NEG
	FLUID PROPERT	TIES	method	limit/base	current	history1	history2
~~~~~	Visc @ 100°C	cSt	ASTM D445	13.2	13.2	13.1	13.5
	GRAPHS						
	Iron (ppm)				Lead (ppm)		
	120 100			10	Q		
Feb 13/23 Apr28/23 Nov13/23 Dec20/23	80 - Severe			1			
Feb Nov Dec	E 60		1	udd .	Abnormal		4
	40 -		1				1
	20	-	Jh.			ma	that
		1/23	/23		22	122	123
	Mar7/22 May11/22 0ct12/22 Dec7/22	Feb13/23	Apr28/23 Nov13/23	חמרקית	Mar7/22 May11/22 Oct12/22	Dec7/22 Feb13/23 Apr28/23	Nov13/23
	Aluminum (ppm)	12573			Chromium (pp		
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	Severe				+ - G		
	E 10 - Abnormal			mqq	3		
Feb13/23 Apr28/23 Nov13/23 Dec20/23				d,	2 - Abnormal		
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	Copper (ppm)	00005555	120000000000	400	Silicon (ppm)	107700000000000000000000000000000000000	000000000000000000000000000000000000000
	25 Severe			300	S		
	20		A				
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	2 -		Nov		2 -	De Feb	Nov
	Viscosity @ 100°C	2			Base Number		
	Abnormal			(0), HO (0), H	Base		
				0,8 KO	J + Q		MAN
	(0-001) 14 835			<u>ب</u> 6.0		min	ww
	Base 12			Im 4.(	MM		
	THE REPORT OF THE			88 2.0 88			
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	Mar7/22 May11/22 0ct12/22 Dec7/22	Feb13/23	Apr28/23 Nov13/23	חמרלו	Mar7/22 May11/22 0ct12/22	Dec7/22 Feb13/23 Apr28/23	Nov13/23 Dec20/23
Laboratory Sample No. Lab Number Unique Number Test Packag discuss this sample report	: 06065104 er : 10836486 e : MOB 2 c, contact Customer Serv	Recieve Diagnos Diagnos ice at 1-8	d : 18 ed : 22 tician : Sea 800-237-136	Jan 2024 Jan 2024 an Felton 9.		W	•••
Denotes test methods that atements of conformity to spe					(JCGM 106:2012)		T F
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