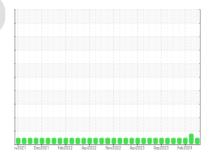


OIL ANALYSIS REPORT

Sample Rating Trend







JENBACHER GM04 (S/N 1144825)

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

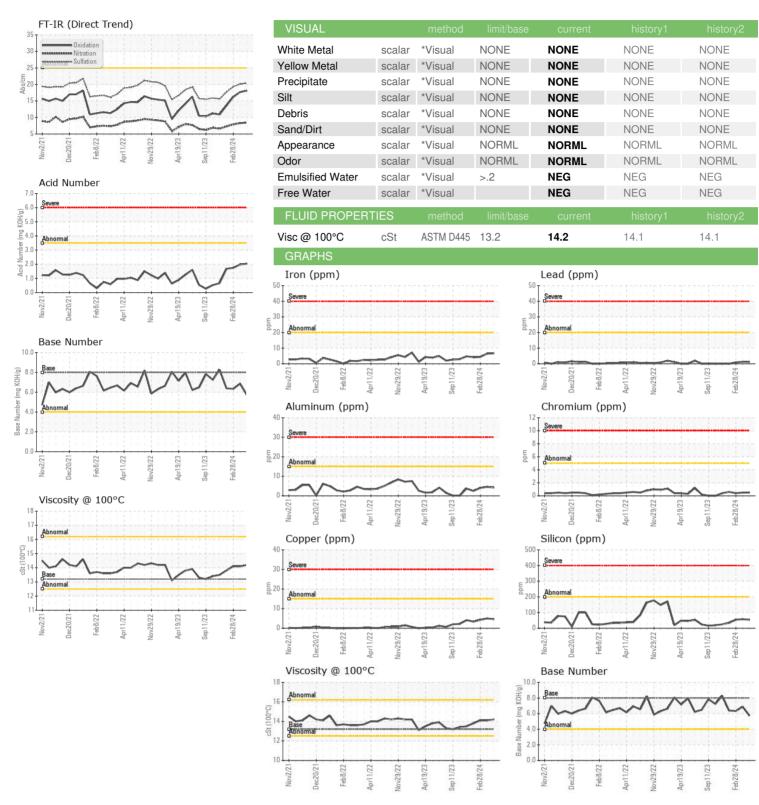
Fluid Condition

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 suitable for further service.

Sample Number							
Sample Date Client Info 16 Apr 2024 21 Mar 2024 28 Feb 2	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 47279 46710 46430 Oil Age hrs Client Info 5616 5047 4767 Oil Changed Client Info 5616 5047 4767 Not Changd Not Changd Not Changd Not Changd Sample Status Imition Not Changd Not Changd CONTAMINATION method Imition 1.0 <1.0	Sample Number		Client Info		WC0914240	WC0914251	WC0853017
Oil Age hrs Client Info 5616 5047 4767 Oil Changed Sample Status Client Info Not Changd Not Chan	Sample Date		Client Info		16 Apr 2024	21 Mar 2024	28 Feb 2024
Oil Changed Sample Status Client Info Not Changd NORMAL Not Changd ABNORMAL Not Changd ABNORMANA Not Changd ABNORMANA	Machine Age	hrs	Client Info		47279	46710	46430
CONTAMINATION	Oil Age	hrs	Client Info		5616	5047	4767
CONTAMINATION	Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Fuel	Sample Status				NORMAL	ABNORMAL	NORMAL
Water WC Method >.2 NEG NEG NEG Glycol WC Method Image NEG NEG NEG WEAR METALS method limit/base current history1 hist Iron ppm ASTM D5185m >20 7 6 4 Chromium ppm ASTM D5185m >5 <1	CONTAMINATION	J	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >5 <1 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>20	7	6	4
Description	Chromium	ppm	ASTM D5185m	>5	<1	<1	<1
Sliver ppm ASTM D5185m >5 0 0 0 Aluminum ppm ASTM D5185m >15 4 5 4 Lead ppm ASTM D5185m >20 1 1 <1	Nickel	ppm	ASTM D5185m	>2	0	<1	0
Aluminum ppm ASTM D5185m >15 4 5 4 Lead ppm ASTM D5185m >20 1 1 <1	Titanium	ppm	ASTM D5185m		0	0	0
Lead ppm ASTM D5185m >20 1 1 <1 <1 Copper ppm ASTM D5185m >15 5 5 4 Tin ppm ASTM D5185m >5 8 ♠ 9 8 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 hist Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 hist Boron ppm ASTM D5185m 0 0 0 0 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 2 3 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Silver	ppm	ASTM D5185m	>5	0	0	0
Copper ppm ASTM D5185m >15 5 5 4 Tin ppm ASTM D5185m >5 8 ▶ 9 8 Vanadium ppm ASTM D5185m <1	Aluminum	ppm	ASTM D5185m	>15	4	5	4
Tin ppm ASTM D5185m >5 8 ● 9 8 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 hist Boron ppm ASTM D5185m 0 2 2 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 2 3 <1 Manganese ppm ASTM D5185m 2 3 <1 Magnesium ppm ASTM D5185m 2552 2546 2413 Phosphorus ppm ASTM D5185m 2552 2546 2413 Phosphorus ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1	Lead	ppm	ASTM D5185m	>20	1	1	<1
Tin ppm ASTM D5185m >5 8	Copper	ppm	ASTM D5185m	>15	5	5	4
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 hist Boron ppm ASTM D5185m 0 2 2 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 2 3 <1			ASTM D5185m	>5	8	<u> </u>	8
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 hist Boron ppm ASTM D5185m 0 2 2 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 2 3 <1	Vanadium		ASTM D5185m		<1	0	0
Boron	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 2 3 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 2 3 <1 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 13 15 14 Calcium ppm ASTM D5185m 2552 2546 2413 Phosphorus ppm ASTM D5185m 431 458 450 Zinc ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 2 2 2 2 Sodium ppm ASTM D5185m >20 0 3 0 INFRA-RED	Boron	ppm	ASTM D5185m		0	2	2
Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 13 15 14 Calcium ppm ASTM D5185m 2552 2546 2413 Phosphorus ppm ASTM D5185m 431 458 450 Zinc ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist <th< td=""><td>Barium</td><td>ppm</td><td>ASTM D5185m</td><td></td><th>0</th><td>0</td><td>0</td></th<>	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 13 15 14 Calcium ppm ASTM D5185m 2552 2546 2413 Phosphorus ppm ASTM D5185m 431 458 450 Zinc ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3	Molybdenum	ppm	ASTM D5185m		2	3	<1
Calcium ppm ASTM D5185m 2552 2546 2413 Phosphorus ppm ASTM D5185m 431 458 450 Zinc ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 431 458 450 Zinc ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current hi	Magnesium	ppm	ASTM D5185m		13	15	14
Zinc ppm ASTM D5185m 471 546 540 Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18	Calcium	ppm	ASTM D5185m		2552	2546	2413
Sulfur ppm ASTM D5185m 2867 3044 2637 CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045<	Phosphorus	ppm	ASTM D5185m		431	458	450
CONTAMINANTS method limit/base current history1 hist Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Zinc	ppm	ASTM D5185m		471	546	540
Silicon ppm ASTM D5185m >200 53 58 53 Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Sulfur	ppm	ASTM D5185m		2867	3044	2637
Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium ppm ASTM D5185m >20 2 2 2 2 Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Silicon	ppm	ASTM D5185m	>200	53	58	53
Potassium ppm ASTM D5185m >20 0 3 0 INFRA-RED method limit/base current history1 hist Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Sodium		ASTM D5185m	>20	2	2	2
Soot % % *ASTM D7844 >2 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Potassium	ppm	ASTM D5185m	>20	0	3	0
Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 7.9 Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Soot %	%	*ASTM D7844	>2	0.1	0	0
Sulfation Abs/.1mm *ASTM D7415 >30 20.4 20.1 19.3 FLUID DEGRADATION method limit/base current history1 hist Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74		Abs/cm					
Oxidation Abs/.1mm *ASTM D7414 >25 18.1 17.7 16.2 Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74							
Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Acid Number (AN) mg KOH/g ASTM D8045 2.05 1.98 1.74	Oxidation	Abs/.1mm	*ASTM D7414	>25	18.1	17.7	16.2
, , ,							
Base Number (BN) mg KOH/g ASTM D2896 8.0 5.72 6.86 6.33	` ,			8.0			



OIL ANALYSIS REPORT







Certificate 12367

Laboratory Sample No. Lab Number : 06154645 Unique Number : 10990068 Test Package : MOB 2

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0914240

Received : 19 Apr 2024 **Tested** Diagnosed

: 23 Apr 2024 : 23 Apr 2024 - Sean Felton

RICHLAND CREEK 5691 S RICHLAND CREEK RD BUFORD, GA US 30518

Contact: MATT DICKENS matt.dickens@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)

Report Id: RICBUF [WUSCAR] 06154645 (Generated: 04/23/2024 15:30:32) Rev: 1

Contact/Location: MATT DICKENS - RICBUF

T:

F: