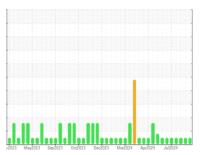


OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Machine Id
4EK05286

Component
Biogas Engine

D-A Lubricant Blue Flame HB-8 40W (--- GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Fuel content negligible. There is no indication of any contamination in the oil.

Fluid Condition

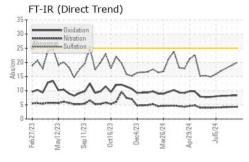
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

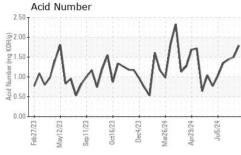
Sample Number Client Info WC0880253 WC0880284 WC0880284 Client Info Sample Date Client Info S3545 S3481 S3430 S3485 S3481 S3480 S3485 S3481 S3485	(L)		12023 May20	123 Sep2023 Oct2023	Uec2023 Mar2024 Apr2024	Jul2024	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 292 227 177	Sample Number		Client Info		WC0880253	WC0880284	WC0880283
Oil Age hrs Client Info 292 227 177 Oil Changed Client Info N/A Not Changd N/A Sample Status Client Info N/A NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method V.0 A1.0 <1.0 <1.0 <1.0 Water WC Method V.1 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m 2.5 8 8 8 RChromium ppm ASTM D5185m >2 0 0 <1 1 Nickel ppm ASTM D5185m >2 0 0 <1 1 Itirahium ppm ASTM D5185m >5 0 0 <1 1 Alluminum ppm ASTM D5185m >10 <	Sample Date		Client Info		15 Jul 2024	12 Jul 2024	10 Jul 2024
Oil Age hrs Client Info 292 227 177 Oil Changed Client Info N/A Not Changd N/A Sample Status Client Info N/A NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method V.0 A1.0 <1.0 <1.0 <1.0 Water WC Method V.1 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m 2.5 8 8 8 RChromium ppm ASTM D5185m >2 0 0 <1 1 Nickel ppm ASTM D5185m >2 0 0 <1 1 Itirahium ppm ASTM D5185m >5 0 0 <1 1 Alluminum ppm ASTM D5185m >10 <	•	hrs	Client Info		83545	83481	83430
NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history3 history3 history3 history3 history3 history3 history3 history3 history3 history4 history4 history4 history4 history4 history4 history5 hi	Oil Age	hrs	Client Info		292	227	177
NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history3 history3 history3 history3 history3 history3 history3 history3 history3 history4 history4 history4 history4 history4 history4 history5 hi	Oil Changed		Client Info		N/A	Not Changd	N/A
Fuel	-				NORMAL		NORMAL
Water WC Method So.1 NEG N	CONTAMINATIO	N	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >45 8 8 8 Chromium ppm ASTM D5185m >2 0 0 <1	Water		WC Method	>0.1	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>45	8	8	8
Titanium	Chromium	ppm	ASTM D5185m	>2	0	0	<1
Silver	Nickel	ppm	ASTM D5185m	>2	0	0	<1
Aluminum	Titanium	ppm	ASTM D5185m		0	0	<1
Lead	Silver	ppm	ASTM D5185m	>5	0	0	<1
Lead	Aluminum	ppm	ASTM D5185m	>10	2	2	2
Copper ppm ASTM D5185m >14 2 1 2 Tin ppm ASTM D5185m >13 <1	Lead		ASTM D5185m	>5	0		<1
Tin	Copper			>14	2	1	
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 0 1 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m <1 <1 2 Manganese ppm ASTM D5185m <1 0 0 Magnesium ppm ASTM D5185m 2370 2454 2436 Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 220 156 130 102 Sodium ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m >20 0					- -1		
Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 0 1 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m <1							
Boron					-		
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m <1 <1 2 Manganese ppm ASTM D5185m <1 0 0 Magnesium ppm ASTM D5185m 6 10 8 Calcium ppm ASTM D5185m 2370 2454 2436 Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m 200 156 130 102 Sodium ppm ASTM D5185m 20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/.1mm *ASTM D7415 <	Boron	ppm	ASTM D5185m		0	0	1
Manganese ppm ASTM D5185m <1 0 0 Magnesium ppm ASTM D5185m 6 10 8 Calcium ppm ASTM D5185m 2370 2454 2436 Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m >20 0 0 2 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7624 >20 4.3 4.3 4.2 Sulfation	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 6 10 8 Calcium ppm ASTM D5185m 2370 2454 2436 Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m 2 2 2 0 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/	Molybdenum	ppm	ASTM D5185m		<1	<1	2
Calcium ppm ASTM D5185m 2370 2454 2436 Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m >20 0 0 2 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1	Manganese	ppm	ASTM D5185m		<1	0	0
Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1	Magnesium	ppm	ASTM D5185m		6	10	8
Phosphorus ppm ASTM D5185m 307 335 329 Zinc ppm ASTM D5185m 371 406 412 Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1	Calcium	ppm	ASTM D5185m		2370	2454	2436
Zinc ppm ASTM D5185m 371 406 412	Phosphorus		ASTM D5185m		307	335	329
Sulfur ppm ASTM D5185m 4889 5155 4104 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50			ASTM D5185m				412
Silicon ppm ASTM D5185m >200 156 130 102 Sodium ppm ASTM D5185m 2 2 2 0 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	Sulfur		ASTM D5185m		-		4104
Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	CONTAMINANTS	,	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 0 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history. Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	Silicon	ppm	ASTM D5185m	>200	156	130	102
INFRA-RED	Sodium	ppm	ASTM D5185m		2	2	0
Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	Potassium	ppm	ASTM D5185m	>20	0	0	2
Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7615 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 >20 4.3 4.3 4.2 Sulfation Abs/.1mm *ASTM D7615 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	Soot %	%	*ASTM D7844		0	0	0
Sulfation Abs/.1mm *ASTM D7415 >30 19.9 18.9 18.0 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44		Abs/cm		>20		4.3	4.2
Oxidation Abs/.1mm *ASTM D7414 >25 8.3 8.3 8.2 Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44							
Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	FLUID DEGRADA	ATION	method	limit/base	current	history1	history2
Acid Number (AN) mg KOH/g ASTM D8045 1.79 1.50 1.44	Oxidation	Abs/.1mm	*ASTM D7414	>25	8.3	8.3	8.2
	\ -/	0 - 0					

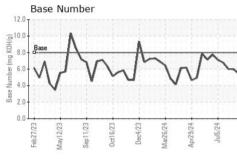


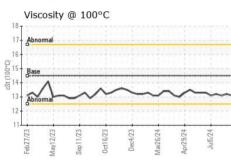
OIL ANALYSIS REPORT

FLUID PROPERTIES









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

Visc @ 100°C	cSt /	ASTM D445 14.5	13.1	13.2	13.1
GRAPHS					
Iron (ppm) Severe Abnormal 20 0 to Severe Abnormal 20 20 20 20 20 20 20 20 20 2	Dec4/23 + Mar26/24	Api29/24	Lead (ppm) Severe Abnormal Abnormal Seb 11/128	Oct16/23	Mar26/24 + Apr29/24 -
Aluminum (ppm) Severe Abnormal	~~		Chromium (p		Mass
Copper (ppm) 30 Severe Se	Dec4/23	Apr29/24 -	Silicon (ppm) 500 400 Sevent 200 About About 100		Maz6274 Apr29/24 Jul5/24
Viscosity @ 100°C	Dec4/23 -	Apr29/24 -	Base Number		Mar26:24 - Apr29:24 - Jul5:24 -
Abnormal Base Abnormal Abnormal	~~		(S) 10.0 + Base (S) 10	~~	w





Sample No. : WC0880253 Lab Number : 06237982

Unique Number : 11126816

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 16 Jul 2024 **Tested** : 17 Jul 2024

Diagnosed

: 18 Jul 2024 - Sean Felton

BI-COUNTY 3214 DOVER RD WOODLAWN, TN US 37191 Contact: KEVIN WEAVER

Test Package : MOB 2 Certificate 12367 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: BICWOOTN [WUSCAR] 06237982 (Generated: 07/18/2024 11:06:31) Rev: 1

Contact/Location: KEVIN WEAVER - BICWOOTN

kevin.weaver@cubedistrictenergy.com

T:

F: