

OIL ANALYSIS REPORT

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NORMAL

Machine Id 4EK05286

Component Biogas Engine

Fluid

D-A Lubricant Blue Flame HB-8 40W (--- 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.

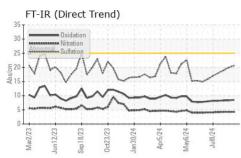
Fluid Condition

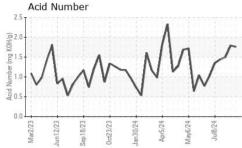
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

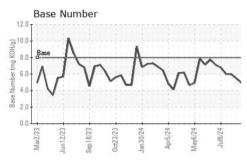
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0880252	WC0880253	WC0880284
Sample Date		Client Info		17 Jul 2024	15 Jul 2024	12 Jul 2024
Machine Age	hrs	Client Info		83590	83545	83481
Oil Age	hrs	Client Info		337	292	227
Oil Changed		Client Info		N/A	N/A	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	N	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	9	8	8
Chromium	ppm	ASTM D5185m	>2	0	0	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>10	2	2	2
Lead	ppm	ASTM D5185m	>5	0	0	0
Copper	ppm	ASTM D5185m		2	2	1
Tin	ppm	ASTM D5185m	>13	_ <1	<1	<1
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		0	0	0
				0	0	0
Barium	ppm	ASTM D5185m		U	0	0
	ppm ppm	ASTM D5185m ASTM D5185m		1	<1	<1
Molybdenum	ppm					
Molybdenum	ppm ppm	ASTM D5185m		1	<1	<1
Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m		1 0	<1 <1	<1 0
Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		1 0 7	<1 <1 6	<1 0 10
Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		1 0 7 2500	<1 <1 6 2370	<1 0 10 2454
Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		1 0 7 2500 300	<1 <1 6 2370 307	<1 0 10 2454 335
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	1 0 7 2500 300 359	<1 <1 6 2370 307 371	<1 0 10 2454 335 406
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base >200	1 0 7 2500 300 359 4882	<1 <1 6 2370 307 371 4889	<1 0 10 2454 335 406 5155
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method		1 0 7 2500 300 359 4882 current	<1 <1 6 2370 307 371 4889 history1	<1 0 10 2454 335 406 5155 history2
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m	>200	1 0 7 2500 300 359 4882 current 179	<1 <1 6 2370 307 371 4889 history1 156	<1 0 10 2454 335 406 5155 history2 130
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	>200	1 0 7 2500 300 359 4882 current 179 2	<1 <1 6 2370 307 371 4889 history1 156 2	<1 0 10 2454 335 406 5155 history2 130 2
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	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 ASTM D5185m	>200 >20	1 0 7 2500 300 359 4882 <u>current</u> 179 2 0	<1 <1 6 2370 307 371 4889 history1 156 2 0	<1 0 10 2454 335 406 5155 history2 130 2 0
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	>200 >20 limit/base	1 0 7 2500 300 359 4882 current 179 2 0 0	<1 <1 6 2370 307 371 4889 history1 156 2 0 history1	<1 0 10 2454 335 406 5155 history2 130 2 0 history2
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	>200 >20 limit/base	1 0 7 2500 300 359 4882 current 179 2 0 current 0	<1 <1 6 2370 307 371 4889 history1 156 2 0 history1 0	<1 0 10 2454 335 406 5155 history2 130 2 0 history2 0
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 *ASTM D7844	>200 >20 limit/base	1 0 7 2500 300 359 4882 <u>current</u> 179 2 0 0 <u>current</u> 0 4.3	<1 <1 6 2370 307 371 4889 history1 156 2 0 history1 0 history1 0 4.3	<1 0 10 2454 335 406 5155 history2 130 2 0 history2 0 history2 0 4.3
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 D51854 *ASTM D7844 *ASTM D7624	>200 >20 limit/base >20 >30	1 0 7 2500 300 359 4882 <u>current</u> 179 2 0 <u>current</u> 0 4.3 20.6	<1 <p><1</p> 6 2370 307 371 4889 history1 156 2 0 history1 0 4.3 19.9	<1 0 10 2454 335 406 5155 history2 130 2 0 history2 0 history2 0 4.3 18.9
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm 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 ASTM D5185m *ASTM D7844 *ASTM D7624 *ASTM D7415	>200 >20 limit/base >20 >30 limit/base	1 0 7 2500 300 359 4882 current 179 2 0 current 0 4.3 20.6 current	<1 <1 <1 6 2370 307 371 4889 history1 156 2 0 history1 0 4.3 19.9 history1 	<1 0 10 2454 335 406 5155 history2 130 2 0 history2 0 4.3 18.9 history2
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 D7844 *ASTM D7415	>200 >20 limit/base >20 >30 limit/base >25	1 0 7 2500 300 359 4882 current 179 2 0 current 0 4.3 20.6 current 8.5	<1 <1 <1 6 2370 307 371 4889 history1 156 2 0 history1 0 4.3 19.9 history1 8.3 	<1 0 10 2454 335 406 5155 history2 130 2 0 history2 0 4.3 18.9 history2 8.3

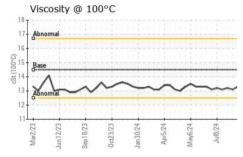


OIL ANALYSIS REPORT









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 PROPERTI	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.5	13.3	13.1	13.2
GRAPHS						
Iron (ppm)			10-10	Lead (ppm)		
80 - Severe				Ocvere		
50 Abnormal			ε 6	Abnormal		
40 - Abnormal	٨		Edd 4		A	
20	$ \square$	~ A	2		VM.	٨٨
	24	24 24 24	0		24	Z4 24
Mar2/23 Jun12/23 Sep18/23 Oct23/23	Jan30/24	Apr5/24 May6/24 Jul8/24		Mar2/23 Jun12/23 Sep18/23	0ct23/23 Jan30/24 Apr5/24	May6/24 Jul8/24
Aluminum (ppm)				Chromium (p		
20 Severe			5	Tannangananan		100000000000000000000000000000000000000
15 -			4	Severe		
10 - Abnormal				Abnormal		
5-10 000	-		2			
1-20	W	\sim	<u> </u>	M	Law	m
Mar2/23	Jan30/24 -	Apr5/24 May6/24		Mar2/23	0ct23/23 Jan30/24 Apr5/24	May6/24
505 ALTA CON	Jan	Ar Ma		5	Doct Jan	Ma
Copper (ppm)			500	Silicon (ppm)		
25 Severe			400	The second second second second		
20				. /		
15 - Abnormal			툍 ³⁰⁰ 된 200	Abnormal	101	1
5 Man -		Λ.	100		VLV	Vh/
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Mar2/23 Jun12/23 Sep18/23 Oct23/23	Jan30/24	Apr5/24 May6/24 Jul8/24		Mar2/23 Jun12/23 Sep18/23	0ct23/23 Jan30/24 Apr5/24	May6/24 Jul8/24
r s o	Ja	* ¥ 7			Jai A	≥ ′
Viscosity @ 100°C		17000000000000	12.0	Base Number		000000000000000000000000000000000000000
Abnormal			B/H00	Rama A		
Base Annorma			y B 8.0		M	- M
Attnormal	~~	$\sim\sim$		/\/ V	~ V	\sim
12			2 1.0			
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	- +2	4 4	0.0		13 4	4
Mai2/23 0 Jun 12/23 0 Sep 18/23 0 Oct23/23 0	Jan30/24 +	Apr5/24 May6/24	0.0		0ct23/23 Jan30/24 Apr5/24	May6/24

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 **BI-COUNTY** Sample No. : WC0880252 Received 3214 DOVER RD : 18 Jul 2024 Lab Number : 06240526 Tested : 19 Jul 2024 WOODLAWN, TN Unique Number : 11129360 Diagnosed : 20 Jul 2024 - Don Baldridge US 37191 Test Package : MOB 2 Contact: KEVIN WEAVER Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. kevin.weaver@cubedistrictenergy.com * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Т: Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F:

Report Id: BICWOOTN [WUSCAR] 06240526 (Generated: 07/21/2024 11:56:43) Rev: 1

Contact/Location: KEVIN WEAVER - BICWOOTN