

OIL ANALYSIS REPORT

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NORMAL

Machine Id

Middle Biogas Engine

Fluid CITGO PACEMAKER GAS ENGINE LFG LA 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

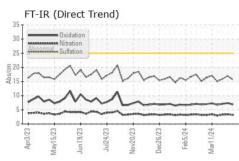
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

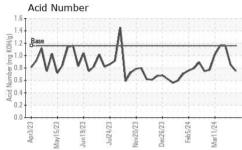
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0803406	WC0803405	WC0803408
Sample Date		Client Info		08 Apr 2024	01 Apr 2024	25 Mar 2024
Machine Age	hrs	Client Info		66712	66547	66383
Oil Age	hrs	Client Info		116	327	163
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	J	method	limit/base	current	history1	history2
Fuel	<u> </u>	WC Method	>4.0	<1.0	<1.0	<1.0
Water		WC Method		NEG	NEG	NEG
Glycol		WC Method	20.1	NEG	NEG	NEG
-			1	-		-
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>45	2	6	8
Chromium	ppm	ASTM D5185m	>2	0	0	<1
Nickel	ppm	ASTM D5185m	>2	<1	<1	1
Titanium	ppm	ASTM D5185m		0	0	<1
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>10	2	2	2
Lead	ppm	ASTM D5185m	>5	0	1	1
Copper	ppm	ASTM D5185m	>14	2	1	3
Tin	ppm	ASTM D5185m	>13	2	4	4
Vanadium	ppm	ASTM D5185m		0	0	<1
Cadmium	ppm	ASTM D5185m		0	0	<1
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		<1	<1	3
Barium	ppm	ASTM D5185m		0	0	0
Molybdenum	ppm	ASTM D5185m		1	<1	8
Manganese	ppm	ASTM D5185m		1	<1	<1
Magnesium				15	1.0	00
0	ppm	ASTM D5185m		10	10	26
Calcium	ppm ppm	ASTM D5185m ASTM D5185m		1469	10 1403	1464
-				-		
Calcium	ppm	ASTM D5185m		1469	1403	1464
Calcium Phosphorus	ppm ppm	ASTM D5185m ASTM D5185m		1469 302	1403 287	1464 322
Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	1469 302 360	1403 287 346	1464 322 368
Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		1469 302 360 3294	1403 287 346 3471	1464 322 368 3150
Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method		1469 302 360 3294 current	1403 287 346 3471 history1	1464 322 368 3150 history2
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	>200	1469 302 360 3294 current 91	1403 287 346 3471 history1 197	1464 322 368 3150 history2 136
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	>200	1469 302 360 3294 current 91 2	1403 287 346 3471 history1 197 7	1464 322 368 3150 history2 136 <1
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	>200 >20	1469 302 360 3294 current 91 2 2 2	1403 287 346 3471 history1 197 7 7 7	1464 322 368 3150 history2 136 <1 2
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>200 >20 limit/base	1469 302 360 3294 current 91 2 2 2 current	1403 287 346 3471 history1 197 7 7 7 history1	1464 322 368 3150 history2 136 <1 2 history2
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>200 >20 limit/base	1469 302 360 3294 current 91 2 2 2 current 0	1403 287 346 3471 history1 197 7 7 7 history1 0	1464 322 368 3150 history2 136 <1 2 history2 0
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm pm source pcm source Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7844	>200 >20 limit/base >20	1469 302 360 3294 current 91 2 2 2 current 0 3.2	1403 287 346 3471 history1 197 7 7 7 history1 0 3.4	1464 322 368 3150 history2 136 <1 2 history2 0 3.3
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm % Abs/cm Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7844	>200 >20 limit/base >20 >30 limit/base	1469 302 360 3294 current 91 2 2 2 current 0 3.2 15.6 current	1403 287 346 3471 history1 197 7 7 history1 0 3.4 17.0 history1	1464 322 368 3150 history2 136 <1 2 history2 0 3.3 15.9 history2
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 D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415 method	>200 >20 limit/base >20 >30 limit/base >25	1469 302 360 3294 current 91 2 2 2 current 0 3.2 15.6 current 6.9	1403 287 346 3471 197 7 7 history1 0 3.4 17.0 history1 7.4	1464 322 368 3150 history2 136 <1 2 history2 0 3.3 15.9 history2 7.1
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm % Abs/cm Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7844	>200 >20 limit/base >20 >30 limit/base	1469 302 360 3294 current 91 2 2 2 current 0 3.2 15.6 current	1403 287 346 3471 history1 197 7 7 history1 0 3.4 17.0 history1	1464 322 368 3150 history2 136 <1 2 history2 0 3.3 15.9 history2

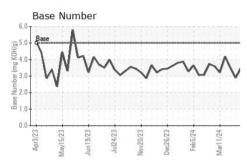
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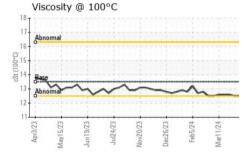


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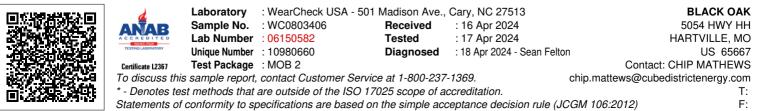








VISUAL		method	limit/base	current	history	1 h	istory	
White Metal	scalar	*Visual	NONE	NONE	NONE	NC	DNE	
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE		
Precipitate	scalar	*Visual	NONE	NONE	NONE	NC	NONE	
Silt	scalar	*Visual	NONE	NONE	NONE	NC	NONE	
Debris	scalar	*Visual	NONE	NONE	NONE	NC	NONE	
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NC	NONE	
Appearance	scalar	*Visual	NORML	NORML	NORML	NC	NORML	
Odor	scalar	*Visual	NORML	NORML	NORML	NC	NORML	
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NE	G	
Free Water	scalar	*Visual		NEG	NEG	NE		
FLUID PROPERTI	ES	method	limit/base	current	history	1 h	istory	
Visc @ 100°C	cSt	ASTM D445	13.5	12.5	12.5	12	.6	
GRAPHS								
Iron (ppm)				Lead (ppm)				
Severe				8 Severe				
Abnormal			ud d	4 Abnormal				
				2				
L	~		\sim		~h	~		
	0/23	5/23	1 1		4/23 1/23	3/23	/24	
Apr3/23 May15/23 Jun19/23 Jul24/23	Nov20/23	Dec26/23 Feb5/24 Mar11/24		Apr3/23 May15/23 Jun19/23	Jul24/23 Nov20/23	Dec26/23 Feb5/24	Mar11/24	
Aluminum (ppm)	-		-	Chromium (p	_			
0 T				5 T			0.56141	
Severe				4 - Severe				
0 - denormal			E	Abnormal				
				2 - Abnormal				
5	V			1-1000000000000000000000000000000000000				
	\sim						4	
Apr3/23 May15/23 Jun19/23 Jul24/23	Nov20/23	Dec26/23 Feb5/24 Mar11/24	2/110	Apr3/23 May15/23 Jun19/23	Jul24/23 Nov20/23	Dec26/23 Feb5/24	Mar11/24	
2 7 -	No	Pe Pe		2 r	Jr. Nov	De	Ma	
Copper (ppm)				Silicon (ppm)				
Severe				Saura				
D -				00 - Gevere	n N			
5 - Abnormal			un 100 mg 2	00 - Abnormal	A 11	1.11	1A	
0			1	$\sim M/W$	VVV	WV	VV	
	N	in	\sim	/ • •		1 Y	• ٧	
	0/23	3/23	1.7/	8/23 5/23 1/23	4/23 -	5/23 -	/24-	
Apr3/23 May15/23 Jun19/23 Jul24/23	Nov20/23	Dec26/23 Feb5/24 Mar11/24		Apr3/23 May15/23 Jun19/23	Jul24/23 Nov20/23	Dec26/23 - Feb5/24 -	Mar11/24	
Viscosity @ 100°C	-		-	Base Number	Ka	1999-19	F (1)	
⁸ T		120000200000	-					
Abnormal			N N	5.0 Base	****			
			(Bm)		200		~	
+ Base			a de la companya de	3.0 2.0	- V			
Abnormal		South a second a part of the part of	ny ny					
Abnormal			00 69	0+				
			(D.0				
2	Nov20/23	Dec26/23 + Feb5/24 +	(Jul24/23	Dec26/23	Mar11/24	



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Contact/Location: CHIP MATHEWS - BLAHARMO