

OIL ANALYSIS REPORT

Sample Rating Trend

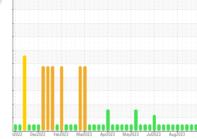
NORMAL



HANM04BE (S/N 4EK00413) Component

Biogas Engine

CHEVRON HDAX LFG SAE 40 (--- GAL)





SAE 40 (GAL)								
SAMPLE INFORM	NATION	method	limit/base	current	history1	history2		
Sample Number		Client Info		WC0851201	WC0851194	WC0851192		
Sample Date		Client Info		29 Sep 2023	22 Sep 2023	30 Aug 2023		
Machine Age	hrs	Client Info		69657	69429	68966		
Oil Age	hrs	Client Info		498	330	999		
Oil Changed		Client Info		Not Changd	Not Changd	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		
Glycol		WC Method		NEG	NEG	NEG		
WEAR METALS		method	limit/base	current	history1	history2		
Iron	ppm	ASTM D5185m	>15	4	4	3		
Chromium	ppm	ASTM D5185m	>4	0	<1	0		
Nickel	ppm	ASTM D5185m	>2	0	1	0		
Titanium	ppm	ASTM D5185m		<1	0	0		
Silver	ppm	ASTM D5185m	>5	0	0	0		
Aluminum	ppm	ASTM D5185m	>6	<1	2	<1		
Lead	ppm	ASTM D5185m	>9	3	2	4		
Copper	ppm	ASTM D5185m	>14	5	6	6		
Tin	ppm	ASTM D5185m	>4	6	5	5		
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	2	<1		
Barium	ppm	ASTM D5185m		0	1	0		
Molybdenum	ppm	ASTM D5185m		4	2	2		
Manganese	ppm	ASTM D5185m		<1	<1	4		
Magnaaium	ppin	AOTIM DOTODIII		· ·	<1	<1		
Magnesium	ppm	ASTM D5185m		5	6	<1 7		
Calcium		ASTM D5185m ASTM D5185m		5 1837	6 1697	7 2141		
Calcium Phosphorus	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	270	5 1837 302	6 1697 272	7 2141 314		
Calcium Phosphorus Zinc	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		5 1837	6 1697 272 343	7 2141 314 381		
Calcium Phosphorus	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		5 1837 302	6 1697 272	7 2141 314		
Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		5 1837 302 363	6 1697 272 343	7 2141 314 381 2660		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	310 limit/base	5 1837 302 363 2515 current 144	6 1697 272 343 2407 history1 123	7 2141 314 381		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	310 limit/base	5 1837 302 363 2515 current	6 1697 272 343 2407 history1	7 2141 314 381 2660 history2		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	310 limit/base >181	5 1837 302 363 2515 current 144	6 1697 272 343 2407 history1 123	7 2141 314 381 2660 history2 145		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	310 limit/base >181	5 1837 302 363 2515 current 144 15	6 1697 272 343 2407 history1 123 17	7 2141 314 381 2660 history2 145 1 <1		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	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	310 limit/base >181 >20 limit/base	5 1837 302 363 2515 <u>current</u> 144 15 <1 <1 <u>current</u> 0	6 1697 272 343 2407 history1 123 17 1 1 history1 0	7 2141 314 381 2660 history2 145 1 <1 <1 history2 0.1		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	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 D7844 *ASTM D7844	310 limit/base >181 >20 limit/base >20	5 1837 302 363 2515 current 144 15 <1 <1 current 0 6.3	6 1697 272 343 2407 history1 123 17 1 history1 0 5.8	7 2141 314 381 2660 history2 145 1 <1 <1 history2 0.1 8.3		
Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	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	310 limit/base >181 >20 limit/base >20	5 1837 302 363 2515 <u>current</u> 144 15 <1 <1 <u>current</u> 0	6 1697 272 343 2407 history1 123 17 1 1 history1 0	7 2141 314 381 2660 history2 145 1 45 1 <1 <1 history2 0.1		
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 ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7844	310 limit/base >181 >20 limit/base >20	5 1837 302 363 2515 current 144 15 <1 <1 current 0 6.3	6 1697 272 343 2407 history1 123 17 1 history1 0 5.8	7 2141 314 381 2660 history2 145 1 <1 <1 history2 0.1 8.3 22.2		
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 D7844 *ASTM D7624	310 limit/base >181 >20 limit/base >20 >30 limit/base	5 1837 302 363 2515 current 144 15 <1 current 0 6.3 19.6	6 1697 272 343 2407 history1 123 17 1 history1 0 5.8 18.5	7 2141 314 381 2660 history2 145 1 <1 <1 history2 0.1 8.3 22.2		
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 ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7844 *ASTM D7624	310 limit/base >181 >20 limit/base >20 >30 limit/base >25	5 1837 302 363 2515 current 144 15 <1 current 0 6.3 19.6 current	6 1697 272 343 2407 history1 123 17 1 history1 0 5.8 18.5 history1	7 2141 314 381 2660 history2 145 1 <1 <1 history2 0.1 8.3 22.2 history2		

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

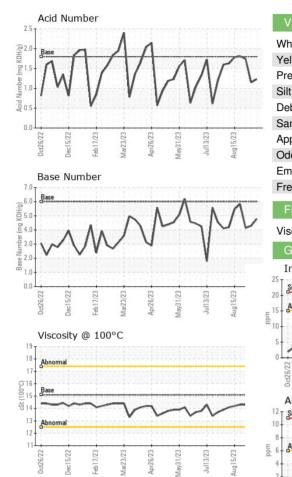
There is no indication of any contamination in the oil.

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.



OIL ANALYSIS REPORT



	VISUAL		method	limit/base	current	history1	history2	
1	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE	
1 110	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE	
11/1/L	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE	
VVV	Silt	scalar	*Visual	NONE	NONE	NONE	NONE	
Y Y Y	Debris	scalar	*Visual	NONE	NONE	NONE	NONE	
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE	
Apr26/23 May31/23 Jul13/23 Aug15/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
Apri Jul Augʻ	Odor	scalar	*Visual	NORML	NORML	NORML	NORML	
	Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG	
	Free Water	scalar	*Visual		NEG	NEG	NEG	
	FLUID PROPERT	ΓIES	method	limit/base	current	history1	history2	
VYVV	Visc @ 100°C	cSt	ASTM D445	15.1	14.1	13.9	14.3	
Y	GRAPHS							
	Iron (ppm)				Lead (ppm)			
	25 Severe			15	Severe			
Apr26/23 May31/23 Jul13/23 Aug15/23	20			10	Abnormal			
A J₁ Au	als- Abromal			bhw		N		
		\cap	M .	5				
			n		\sim	\sim	har	
	0ct26/22 - Dec15/22 - Feb11/23 -	Apr26/23 -	May31/23 . Jul13/23 .	2 2 2	Oct26/22 - Dec15/22 - Feb17/23 -	Mar23/23 - Apr26/23 - May31/23 -	Jul13/23 -	
	Oct2 Dec1 Feb1 Mar2	Apr2	May31/23 Jul13/23	- Root	0ct2 Dec1 Feb1	Mar23/23 Apr26/23 May31/23	Jul13/23 Aug15/23	
	Aluminum (ppm)				Chromium (pp	om)		
111	12 Severe			6	Severe			
	10			4	Abnormal			
23 23	E 6 Abnormal			E S				
Apr26/23 May31/23 Jul13/23 Aug15/23	4			2				
A M , A		M	AN	N		A	~~ ~ ~ ~	
	5/22 5/22 5/23 1/23	3/23	3/23			3/23	3/23	
	0ct26/22 Dec15/22 Feb17/23 Mar23/23	Apr26/23	May31/23 . Jul13/23 .	i Pant	0ct26/22 Dec15/22 Feb17/23	Mar23/23 Apr26/23 May31/23	Jul13/23 - Aug15/23 -	
	Copper (ppm)				Silicon (ppm)	_		
	20 T			300	T3333355555555333		000000000000000000	
	Severe 15 - Abnormal			250	Severe	٨		
	툞 10			 톱 150		IN		
	5		AMA	~ ¹⁰⁰		VV	115°	
	- ^ -	1	VV	50	· · · · ·		V V	
	23 23 23 10	123	23	0 3	122 -	/23 /23 23	/23 -	
	0ct26/22 Dec15/22 Feb17/23 Mar23/23	Apr26/23	May31/23 Jul13/23	n B	0ct26/22 Dec15/22 Feb17/23	Mar23/23 Apr26/23 May31/23	Jul13/23 Aug15/23	
	Viscosity @ 100°C		2 . 4		Base Number	4 7 V	A	
	²⁰ T			0.8 0.3 (0.4 (0.9 (0.9 (0.9 (0.9 (0.9 (0.9 (0.9 (0.9				
	18 - Abnormal			3/HOX 6.0	Base			
	(2016 Base		factories.	Build Build		NN	SNA	
	Abnormal	~	~~		m		V	
	12-			Z 2.0				
	23 23 23 23 23	53	23			23	23 -	
	0ct26/22 Dec15/22 Feb17/23 Mar23/23	Apr26/23	May31/23 Jul13/23	D P	0ct26/22 Dec15/22 Feb17/23	Mar23/23 Apr26/23 May31/23	Jul13/23 Aug15/23	
	M F D O	A	N N	ŝ		Ma	L Au	
Laboratory	: WearCheck USA - 5	501 Madi	son Ave., Ca	ary, NC 27513	B EDL	NA Recips-Ha	ncock Count	
Sample No.	: WC0851201	Received	d : 02	Oct 2023	B HANCOCK COUNTY POWER STATION, 3574 TOWNSHIP ROAD 1			
Lab Number		Diagnos		Oct 2023	FINDLAY, O			
Unique Numbe		Diagnost	t ician : Sea	an Felton				
Task Daale	- · MUR2				Contact: TIM CUSIC tim.cusick@energydevelopments.co			
ate 12367 Test Package		ice at 1-8	00-237-136	9	tim cuei	ck@eneravdov	elonments co	
scuss this sample report enotes test methods that	, contact Customer Serv				tim.cusi	ck@energydev	elopments.cor T	

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