

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



HANM02BE (S/N 3RC00182)

Biogas Engine

CHEVRON HDAX LFG SAE 40 (--- GAL)





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SAMPLE INFORM	ЛАПОМ	method	limit/base	current	history1	history
Sample Number		Client Info		WC0851209	WC0851204	WC085119
Sample Date		Client Info		12 Oct 2023	06 Oct 2023	29 Sep 202
Machine Age	hrs	Client Info		68424	68279	68112
Oil Age	hrs	Client Info		737	592	425
Oil Changed		Client Info		Not Changd	N/A	Not Change
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	N .	method	limit/base	current	history1	history
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history
Iron	ppm	ASTM D5185m	>15	1	0	1
Chromium	ppm	ASTM D5185m	>4	0	<1	0
Nickel	ppm	ASTM D5185m	>2	0	1	0
Titanium	ppm	ASTM D5185m		0	0	<1
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm		>6	<1	0	<1
Lead	ppm	ASTM D5185m	>9	<1	1	1
Copper	ppm	ASTM D5185m	>14	1	<1	0
Tin	ppm	ASTM D5185m	>4	4	4	4
Vanadium	ppm	ASTM D5185m	~ 1	0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
	ppm			-		
ADDITIVES		method	limit/base	current	history1	history
Boron	ppm	ASTM D5185m		0	0	0
Barium	ppm	ASTM D5185m		0	0	0
Molybdenum	ppm	ASTM D5185m		2	0	<1
Manganese	ppm	ASTM D5185m		<1	<1	<1
Magnesium	ppm	ASTM D5185m		12	6	5
Calcium						
	ppm	ASTM D5185m		1760	1769	1807
Phosphorus	ppm ppm	ASTM D5185m ASTM D5185m	270	1760 245	284	
Phosphorus Zinc			270 310			1807
Zinc	ppm	ASTM D5185m		245	284	1807 300
	ppm ppm ppm	ASTM D5185m ASTM D5185m		245 314	284 375	1807 300 368 2358
Zinc Sulfur	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	310 limit/base	245 314 1944	284 375 2416	1807 300 368 2358
Zinc Sulfur CONTAMINANTS	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method	310 limit/base	245 314 1944 current	284 375 2416 history1	1807 300 368 2358 history
Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	310 limit/base >181	245 314 1944 current 122	284 375 2416 history1 113	1807 300 368 2358 history 99
Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m	310 limit/base >181	245 314 1944 current 122 <1	284 375 2416 history1 113 0	1807 300 368 2358 history 99 0 <1
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m	310 limit/base >181 >20	245 314 1944 current 122 <1 0	284 375 2416 history1 113 0 3	1807 300 368 2358 history 99 0 <1
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m	310 limit/base >181 >20	245 314 1944 current 122 <1 0 current	284 375 2416 history1 113 0 3 history1	1807 300 368 2358 history 99 0 <1 kistory
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method	310 limit/base >181 >20 limit/base	245 314 1944 current 122 <1 0 current 0.1	284 375 2416 history1 113 0 3 3 history1 0	1807 300 368 2358 history 99 0 <1 history 0
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624	310 limit/base >181 >20 limit/base >20	245 314 1944 current 122 <1 0 current 0.1 7.2	284 375 2416 history1 113 0 3 history1 0 6.1	1807 300 368 2358 history 99 0 <1 history 0 6.2 19.4
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7824 *ASTM D7415	310 limit/base >181 >20 limit/base >20 >30	245 314 1944 current 122 <1 0 current 0.1 7.2 19.2	284 375 2416 history1 113 0 3 history1 0 6.1 19.3	1807 300 368 2358 history 99 0 <1 history 0 6.2 19.4
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 D7844 *ASTM D7624 *ASTM D7624 *ASTM D7415	310 imit/base >181 >20 imit/base >20 >30 imit/base	245 314 1944 current 122 <1 0 current 0.1 7.2 19.2 current	284 375 2416 history1 113 0 3 history1 0 6.1 19.3 history1	1807 300 368 2358 history 99 0 <1 history 0 6.2 19.4 history

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.



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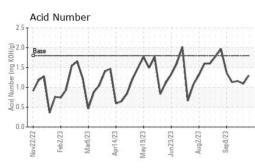
Nov22/22

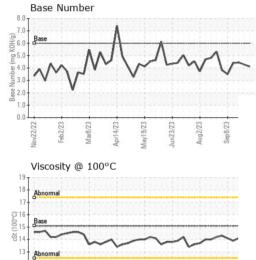
Feb2/23

Mar8/23

OIL ANALYSIS REPORT

VISUAL





		-									
		White Metal	scalar	*Visual	NONE	NONE	NONE	NONE			
AA .	A-A-	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE			
11/	1/1	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE			
/ V	V~	Silt	scalar	*Visual	NONE	NONE	NONE	NONE			
	T	Debris	scalar	*Visual	NONE	NONE	NONE	NONE			
		Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE			
9/23	2/23 -	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML			
May19/23 Jun23/23	Aug2/23 Sep8/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML			
2		Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG			
		Free Water	scalar	*Visual	20.1	NEG	NEG	NEG			
		-		VISUAI		NEG	NEG	NEG			
Λ	• •	FLUID PROPERT		method	limit/base	current	history1	history2			
V	wv	Visc @ 100°C GRAPHS	cSt	ASTM D445	15.1	14.2	14.1	14.1			
		-									
		Iron (ppm)			15 -	Lead (ppm)					
23 -	23 -	20 Severe			1	Severe					
May19/23 Jun23/23	Aug2/23 Sep8/23		100,000	10001000	10-	Abnormal					
M		E 15 - Conormal			E d						
		5			5-			A A			
			~~			m	~~~~~	W L			
		lov22/22 Feb2/23 Mar8/23	9/23	Jun23/23 - Aug2/23 - Sen8/73 -		lov22/22 Feb2/23 Mar8/23	4/23 9/23	Aug2/23			
		Nov22/22 Feb2/23 Mar8/23 Apr14/23	May19/23	Jun23/23 Aug2/23 Sen8/23		Nov22/22 Feb2/23 Mar8/23	Apr14/23 May19/23 Jun23/23	Aug2/23 Sep8/23			
		– Aluminum (ppm)	_			Chromium (pp					
~~~~	12 Severe		100000000000	6	Severe						
	10			5.	Abnormal						
	E 6 Abnormal			4- 팀 3-							
May19/23 Jun23/23	Aug2/23 Sep8/23	4			2						
Mar Jun	Ai Se	2 mm	Λ.	m	٨						
			V h								
		Vov22/22 Feb2/23 Mat6/23	May19/23	Jun23/23 Aug2/23 Sen8/73		Vov22/22 Feb2/23 Mar8/23	Apr14/23 May19/23 Jun23/23	Aug 2/23 Sep 8/23			
		2 7	Ma	A S		Z	Ag Ma Jur	A S			
		Copper (ppm)			250	Silicon (ppm)		000000000000000000000000000000000000000			
		Severe 15 - Abnormal		100100	200-	Severe Abriormat					
		0				Tan	1 1				
		툡 10-			ال ¹⁵⁰ - ق	VVV	VIIV	VV			
		5			50 -	VV	V	Y Y			
		- Mm		~~~							
		Nov22/22 Feb2/23 Mar8/23	9/23	Jun23/23 - Aug2/23 - Sen8/23 -		Nov22/22 - Feb2/23 - Mar6/23	Apr14/23 May19/23	Aug2/23 . Sep8/23 .			
		Nov2 Feb Mar April	May19/23	Aug	5	Nov2 Feb Mar	Apr1 May1 Jun2	Aug			
		Viscosity @ 100°C				Base Number					
		20	100010000	n marine	€8.0	12220202020202020	122000000000000000000000000000000000000				
		18 - Abnormal			(B/HO) Bull 4.0- Bull 2.0- Base Mumber	Base	A				
		Base Base Abnormal				M AN	1/~L	who			
		Abnormal			- dmn	N.N.	V				
		12 -			≥ 2.0- %						
					0.04	3					
		Nov22/22 Feb2/23 Mar6/23	May19/23	Jun23/23 Aug2/23 Sen8/73	4	Vov22/22 Feb2/23 Mar8/23	Apr14/23 May19/23 Jun23/23	Aug2/23 Sep8/23			
		Nor Fr	May	Au		No: Mi	Ap May Jun	Aı			
	Loborator	· MoorChook LICA -			NC 07E10	EDI		noook Court			
4	Laboratory Sample No.	: WearCheck USA - 5 : WC0851209	Received		Oct 2023		NA Recips-Ha UNTY POWER STATION, 3				
	Lab Number		Diagnos		Oct 2023 Oct 2023	TANGOUR GU	UNTER UNLESTATION, J	FINDLAY, O			
REDITED			Diagnost		athan Hester			US 4584			
	Unique Numbe		5					Contact: TIM CUSIC			
REDITED	Unique Numbe Test Package		- <b>J</b>				Contac	t: TIM CUSIC			
ficate L2367 discuss this	Test Packages s sample report		ice at 1-8	00-237-1369		tim.cusi	Contac ck@energydev				