

OIL ANALYSIS REPORT



Brent Run CAT 3 BRRM03BE

Component
Biogas Engine

CHEVRON HDAX 6500 LFG GAS ENGINE OIL (--- GAL)





DIAGNOSIS

Recommendation

We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition. (Customer Sample Comment: 600 hour sample)

Wear

All component wear rates are normal.

Contamination

Elemental level of silicon (Si) above normal.

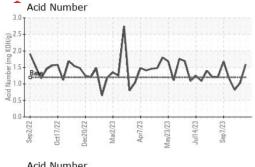
Fluid Condition

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

Sample Date Client Info 12 Oct 2023 28 Sep 2023 21 Sep 2023 Machine Age hrs Client Info 46950 46683 46515 Oil Age hrs Client Info 593 326 158 Oil Changed Client Info Not Changd Not Changd Not Changd Sample Status SEVERE NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >4.0 <1.0 <1.0 <1.0	GAS ENGINE OIL	(GAL)	32022 Oct20	22 Dec2022 Mar2023	Apr2023 May2023 Jul2023	Sep2023	
Sample Date Client Info 12 Oct 2023 28 Sep 2023 21 Sep 2023 21 Sep 2023 46515 46950 46883 46515 46950 46883 46515 46950 46883 46515 46950 46883 46515 46950 46883 46515 46950 46883 46515 46950 46883 46515 46950 46883 46515 46883 46615 46883 46515 46883 46615 46883 46515 46883 46615 468833 468833 468833 468833 468833 468833 468833 468833 468833 468833 46883	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 46950 46683 46515 Dil Age hrs Client Info 593 326 158 Dil Changed Client Info Not Changd	Sample Number		Client Info		WC0776776	WC0663711	WC0663709
Machine Age hrs Client Info 46950 46683 46515 Dil Age hrs Client Info 593 326 158 Dil Changed Client Info Not Changd	Sample Date		Client Info		12 Oct 2023	28 Sep 2023	21 Sep 2023
Dil Changed Client Info SEVERE Not Changed Not Changed NoRMAL Not Changed NoRMAL NoRMAL	•	hrs	Client Info		46950		
CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		593	326	158
Time	-		Client Info		Not Changd	Not Changd	Not Changd
Fuel	Sample Status				SEVERE	NORMAL	NORMAL
WC Method NEG NEG NEG NEG	CONTAMINATIO	N	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >15 3 2 <1	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Chromium	Glycol		WC Method		NEG	NEG	NEG
Description	WEAR METALS		method	limit/base	current	history1	history2
ASTM D5185m Part	ron	ppm	ASTM D5185m	>15	3	2	<1
Description	Chromium	ppm	ASTM D5185m	>4	<1	<1	0
Saliver	Nickel	ppm	ASTM D5185m	>2	<1	<1	<1
Aluminum	Γitanium	ppm	ASTM D5185m		0	<1	0
December December	Silver	ppm	ASTM D5185m	>5	0	0	0
Copper	Aluminum	ppm	ASTM D5185m	>6	2	1	2
Tin	_ead	ppm	ASTM D5185m	>9	<1	<1	0
Anadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m <1 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 1 0 0 Barium ppm ASTM D5185m 3 0 2 Molybdenum ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 0 <1 <1 0 Magnesium ppm ASTM D5185m 1881 1869 1738 Phosphorus ppm ASTM D5185m 302 283 253 Zinc ppm ASTM D5185m 388 336 320 Sulfur ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Solicon ppm ASTM D5185m >20 <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>6</td> <th><1</th> <td>1</td> <td><1</td>	Copper	ppm	ASTM D5185m	>6	<1	1	<1
Cadmium ppm ASTM D5185m <1 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 1 0 0 Barium ppm ASTM D5185m 3 0 2 Molybdenum ppm ASTM D5185m <1	Γin	ppm	ASTM D5185m	>4	5	3	2
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 1 0 0 Barium ppm ASTM D5185m 3 0 2 Molybdenum ppm ASTM D5185m <1	/anadium	ppm	ASTM D5185m		0	<1	0
Soron ppm ASTM D5185m 1 0 0 0	Cadmium	ppm	ASTM D5185m		<1	<1	0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m <1 1 0 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 13 7 6 Calcium ppm ASTM D5185m 1881 1869 1738 Phosphorus ppm ASTM D5185m 302 283 253 Zinc ppm ASTM D5185m 388 336 320 Zinc ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Goldium ppm ASTM D5185m >181 215 154 94 Goldium ppm ASTM D5185m >20 3 <1 1 Potassium ppm ASTM D5185m >20 3 <1 1 INFRA-RED method limit/base current history1 history2 Goot % *ASTM D7624	Boron	ppm	ASTM D5185m		1	0	0
Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 13 7 6 Calcium ppm ASTM D5185m 1881 1869 1738 Phosphorus ppm ASTM D5185m 302 283 253 Zinc ppm ASTM D5185m 388 336 320 Sulfur ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 215 154 94 Godium ppm ASTM D5185m 2 2 2 0 Potassium ppm ASTM D5185m >20 3 <1 1 INFRA-RED method limit/base current history1 history2 Goot % "ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/.1mm	Barium	ppm	ASTM D5185m		3	0	2
Magnesium ppm ASTM D5185m 13 7 6 Calcium ppm ASTM D5185m 1881 1869 1738 Phosphorus ppm ASTM D5185m 302 283 253 Zinc ppm ASTM D5185m 388 336 320 Sulfur ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 215 154 94 Godium ppm ASTM D5185m 22 2 0 Potassium ppm ASTM D5185m >20 3 <1 1 INFRA-RED method limit/base current history1 history2 Goot % *ASTM D7844 0.1 0 0 Sulfation Abs/cm *ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/cm *ASTM D7414 </td <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th><1</th> <td>1</td> <td>0</td>	Molybdenum	ppm	ASTM D5185m		<1	1	0
Calcium ppm ASTM D5185m 1881 1869 1738 Phosphorus ppm ASTM D5185m 302 283 253 Zinc ppm ASTM D5185m 388 336 320 Sulfur ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Soliicon ppm ASTM D5185m >181 215 154 94 Sodium ppm ASTM D5185m 20 3 <1 1 Potassium ppm ASTM D5185m >20 3 <1 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 0 0 Witration Abs/cm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2	Manganese	ppm	ASTM D5185m		0	<1	<1
Phosphorus ppm ASTM D5185m 302 283 253 Zinc ppm ASTM D5185m 388 336 320 Sulfur ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Soliicon ppm ASTM D5185m >181 215 154 94 Soliicon ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m 20 3 <1 1 INFRA-RED method limit/base current history1 history2 Goot % % *ASTM D7844 0.1 0 0 Sulfation Abs/.mm *ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2	Magnesium	ppm	ASTM D5185m		13	7	6
Solifur Soli	Calcium	ppm	ASTM D5185m		1881	1869	1738
Sulfur ppm ASTM D5185m 3085 2614 2470 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 215 154 94 Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 3 <1	Phosphorus	ppm	ASTM D5185m		302	283	253
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 215 154 94 Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 3 <1	Zinc	ppm	ASTM D5185m		388	336	320
Soliticon ppm ASTM D5185m >181 ■ 215 154 94	Sulfur	ppm	ASTM D5185m		3085	2614	2470
Sodium ppm ASTM D5185m 2 2 0 Potassium ppm ASTM D5185m >20 3 <1 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	CONTAMINANTS	3	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 3 <1 1 INFRA-RED method limit/base current history1 history2 Goot % % *ASTM D7844 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	Silicon	ppm	ASTM D5185m	>181	215	154	94
INFRA-RED	Sodium	ppm	ASTM D5185m		2	2	0
Soot % % *ASTM D7844 0.1 0 0 Nitration Abs/cm *ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	Potassium	ppm	ASTM D5185m	>20	3	<1	1
Nitration Abs/cm *ASTM D7624 >20 6.3 6.0 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 23.0 20.3 18.1 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	Soot %	%	*ASTM D7844		0.1	0	0
FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	Nitration	Abs/cm	*ASTM D7624	>20	6.3	6.0	5.6
Dxidation Abs/.1mm *ASTM D7414 > 25 15.7 12.8 10.4 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	Sulfation	Abs/.1mm	*ASTM D7415	>30	23.0	20.3	18.1
Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.59 1.03 0.82	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
, , , ,	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.7	12.8	10.4
Base Number (BN) mg KOH/g ASTM D2896 4.5 3.09 4.16 4.69	Acid Number (AN)	mg KOH/g	ASTM D8045	1.2	1.59	1.03	0.82
	Base Number (BN)		ASTM D2896	4.5	3.09	4.16	4.69



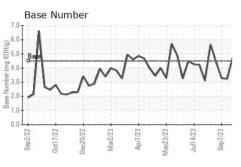
OIL ANALYSIS REPORT



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

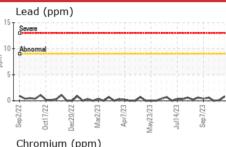
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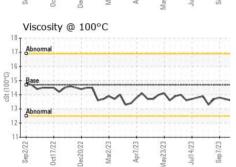
FLUID PROPER	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.7	14.0	13.6	13.6



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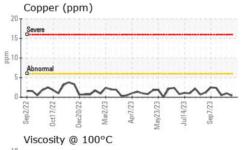
GRAPHS

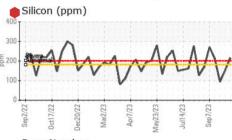


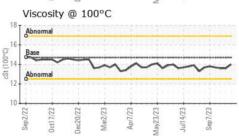


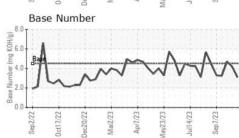
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Sep2/22	0ct17/23	Dec20/23	Mar2/2;	Apr7/23	May23/23	Jul14/23	Sep7/23	
▲ Sili	con (r	nm)						













Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** Test Package : MOB 2

: WC0776776 : 05982001 : 10699296

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 17 Oct 2023 Diagnosed : 19 Oct 2023 Diagnostician : Sean Felton

EDL NA Recips-Brent Run Brent Run Power Station, 8383 Vienna Road

Montrose, MI US 48457-9141

Contact: Rob Stewart

Rob.Stewart@energydevelopments.com

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: EDLMON [WUSCAR] 05982001 (Generated: 10/23/2023 02:43:39) Rev: 1

Submitted By: DOUG HINE

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