

OIL ANALYSIS REPORT

Sample Rating Trend

DEGRADATION



WVTM02BE

Biogas Engine

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





DIAGNOSIS

Recommendation

The oil changed on 11/17 noted. We recommend an early resample to monitor this condition.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

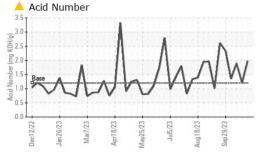
▲ Fluid Condition

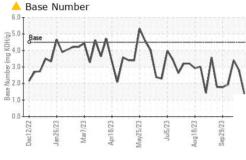
The AN level is above the recommended limit. The BN level is low.

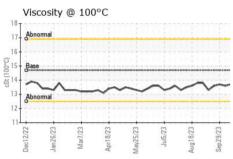
Sample Number Client Info WC0785386 WC0785392 WC0785375 Sample Date Client Info 14 Nov 2023 22 Nov 2023 24 Oct 2023 Action Action Age hrs Client Info 500 214 588 S88 S00 214 588 Not Changed Client Info S000 214 588 Not Changed Client Info Sample Status WC Method ABNORMAL NORMAL N	GAS ENGINE OIL (-	GAL)	c2022 Jan20	23 Mar2023 Apr2023	May2023 Jul2023 Aug2023	Sep2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 1500 41214 41000 500 214 588 588 500 610	Sample Number		Client Info		WC0785386	WC0785392	WC0785379
Oil Age hrs Client Info 500 214 588 Oil Changed Status Client Info Not Changd ABNORMAL Not Changd Changed Changed Sample Status Not Changed ABNORMAL NORMAL	Sample Date		Client Info		14 Nov 2023	02 Nov 2023	24 Oct 2023
Oil Age hrs Client Info 500 214 588 Oil Changed Status Client Info Not Changd ABNORMAL Not Changd Changed Changed Sample Status Not Changed ABNORMAL NORMAL	·	hrs	Client Info		41500	41214	41000
Oil Changed Sample Status Client Info Not Changd ABNORMAL Not Changd NORMAL 1.0 <		hrs	Client Info		500	214	588
ABNORMAL NORMAL NORMAL			Client Info		Not Changd	Not Changd	Changed
Fuel	-					Ü	
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 >15 4 2 3 Chromium ppm ASTM D5185m >4 0 <1	CONTAMINATION	١	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.1	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >4 0 <1 0 Nickel ppm ASTM D5185m >2 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 0 <1 0 Titanium ppm ASTM D5185m 0 0 <1	Iron	ppm	ASTM D5185m	>15	4	2	3
Titanium	Chromium	ppm	ASTM D5185m	>4	0	<1	0
Titanium	Nickel		ASTM D5185m	>2		<1	0
Silver	Titanium		ASTM D5185m		0	0	<1
Aluminum ppm ASTM D5185m >6 2 1 2 Lead ppm ASTM D5185m >9 2 2 1 Copper ppm ASTM D5185m >6 1 <1				>5	-		
Lead ppm ASTM D5185m >9 2 2 1 Copper ppm ASTM D5185m >6 1 <1 1 Tin ppm ASTM D5185m >4 3 2 3 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 <1 1 Barium ppm ASTM D5185m 0 2 0 Barium ppm ASTM D5185m 0 2 0 <1 1 Manganese ppm ASTM D5185m 7 6 6 6 6 6 6 6 6 6 6 6 6 6 7 6 6 6 6 6 7 6 6							
Copper ppm ASTM D5185m >6 1 <1 1 Tin ppm ASTM D5185m >4 3 2 3 Vanadium ppm ASTM D5185m <1							
Tin ppm ASTM D5185m >4 3 2 3 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 <1 1 Barium ppm ASTM D5185m 0 2 0 Molybdenum ppm ASTM D5185m 0 2 0 <1 1 1 Manganese ppm ASTM D5185m <1 0 <1 2 2 1 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 <1 Barium ppm ASTM D5185m 0 2 0 Molybdenum ppm ASTM D5185m <1 1 1 Manganese ppm ASTM D5185m <1 0 <1 1 Magnesium ppm ASTM D5185m 7 6 6 6 Calcium ppm ASTM D5185m 251 247 238 Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20							
Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1				71			
ADDITIVES							
Boron		PP		limit/hase	-		
Barium ppm ASTM D5185m 0 2 0 Molybdenum ppm ASTM D5185m <1		nnm		mini basc			
Molybdenum ppm ASTM D5185m <1 1 1 Manganese ppm ASTM D5185m <1 0 <1 Magnesium ppm ASTM D5185m 7 6 6 Calcium ppm ASTM D5185m 1863 1521 1672 Phosphorus ppm ASTM D5185m 251 247 238 Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 20 0 2 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/.1mm *ASTM D7624							
Manganese ppm ASTM D5185m <1 0 <1 Magnesium ppm ASTM D5185m 7 6 6 Calcium ppm ASTM D5185m 1863 1521 1672 Phosphorus ppm ASTM D5185m 251 247 238 Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 20 0 2 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 5.0 4.9 5.0 Sulfation Abs/:mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION					-		
Magnesium ppm ASTM D5185m 7 6 6 Calcium ppm ASTM D5185m 1863 1521 1672 Phosphorus ppm ASTM D5185m 251 247 238 Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1							
Calcium ppm ASTM D5185m 1863 1521 1672 Phosphorus ppm ASTM D5185m 251 247 238 Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1	-						
Phosphorus ppm ASTM D5185m 251 247 238 Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1	J						
Zinc ppm ASTM D5185m 354 287 297 Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1							
Sulfur ppm ASTM D5185m 3813 3174 3239 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1	•						
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1							
Silicon ppm ASTM D5185m >181 141 73 131 Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 5.0 4.9 5.0 Sulfation Abs/.1mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89			ASTM D5185m		3813	3174	3239
Sodium ppm ASTM D5185m 2 0 2 Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 5.0 4.9 5.0 Sulfation Abs/.1mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 2 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 5.0 4.9 5.0 Sulfation Abs/.1mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	Silicon	ppm	ASTM D5185m	>181	141	73	131
INFRA-RED	Sodium	ppm	ASTM D5185m		2	0	2
Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 >20 5.0 4.9 5.0 Sulfation Abs/.1mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	Potassium	ppm	ASTM D5185m	>20	0	2	<1
Nitration Abs/cm *ASTM D7624 >20 5.0 4.9 5.0 Sulfation Abs/.1mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 25.7 21.0 24.1 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	Soot %	%	*ASTM D7844		0	0	0
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	Nitration	Abs/cm	*ASTM D7624	>20	5.0	4.9	5.0
Oxidation Abs/.1mm *ASTM D7414 >25 14.5 11.0 13.2 Acid Number (AN) mg KOH/g ASTM D8045 1.2 1.98 1.20 1.89	Sulfation	Abs/.1mm	*ASTM D7415	>30	25.7	21.0	24.1
Acid Number (AN) mg KOH/g ASTM D8045 1.2 ▲ 1.98 1.20 1.89	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Acid Number (AN) mg KOH/g ASTM D8045 1.2 ▲ 1.98 1.20 1.89	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.5	11.0	13.2
, , , , , ,							
	Base Number (BN)	mg KOH/g	ASTM D2896	4.5	<u>▲</u> 1.28	2.79	3.41



OIL ANALYSIS REPORT





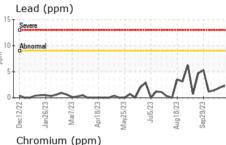


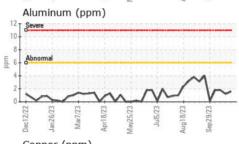
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

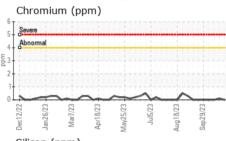
FLUID PROPER	THES	method	iiiiii/base	current	riistory i	HIStory
Visc @ 100°C	cSt	ASTM D445	14.7	13.9	13.7	13.7

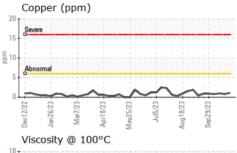
Severe							
Abnor	mal						
1							
1	. ^	. /	1	Λ Λ	M	1	10
-							
,	Y	W	,	7		V.	* V

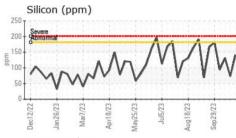
GRAPHS

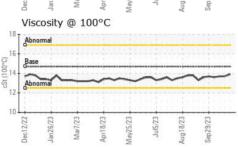


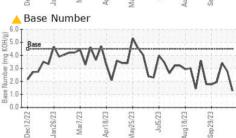
















Certificate L2367

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

: WC0785386 : 06009773 : 10748917

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 16 Nov 2023 : 02 Dec 2023 Diagnosed Diagnostician : Don Baldridge

EDL NA Recips-Watervliet

Watervliet Powerstation, 3563 Hennessey Road Watervliet, MI US 49098

Contact: Scott Eastman

scott.eastman@edlenergy.com T:

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: EDLWAT [WUSCAR] 06009773 (Generated: 12/02/2023 12:40:40) Rev: 1

Submitted By: Scott Eastman

F: