

## **OIL ANALYSIS REPORT**



WEAR

Machine Id **COVM03BE (S/N GZJ00181)** Component **Biogas Engine** 

CHEVRON HDAX 6500 LFG GAS ENGINE OIL (141 GAL)

GAS ENGINE OIL (1	41 GAL)	2020 Dec20	20 Feb2021 May2021	Oct2021 Dec2021 Feb2022	Aug2022	
SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0722563	WC0722567	WC0722557
Sample Date		Client Info		01 Feb 2023	23 Jan 2023	18 Jan 2023
Machine Age	hrs	Client Info		124219	124103	124098
Oil Age	hrs	Client Info		124156	868	873
Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Sample Status				SEVERE	SEVERE	SEVERE
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	<b>e</b> 204	281	85
Chromium	ppm	ASTM D5185m	>4	1	2	<1
Nickel	ppm	ASTM D5185m	>2	• 5	20	6
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm		>5	0	0	<1
Aluminum	ppm	ASTM D5185m	>6	4	<u>∧</u> 7	2
Lead	ppm	ASTM D5185m	>9	2	2	<1
Copper	ppm	ASTM D5185m	>6	-	3	2
Tin	ppm	ASTM D5185m	>4	<1	3	1
Vanadium	ppm	ASTM D5185m	21	<1	0	0
						0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES	ppm	ASTM D5185m method	limit/base	0 current	0 history1	-
	ppm ppm		limit/base	-	-	-
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 7	history1 8	history2 9
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185m ASTM D5185m	limit/base	current 7 0	history1 8 0	history2 9 0
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	current 7 0 7	history1 8 0 8	history2 9 0 6
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	current 7 0 7 <1	history1 8 0 8 4	history2 9 0 6 1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	current           7           0           7           <1	history1 8 0 8 4 27	history2 9 0 6 1 27
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	current           7           0           7           23           1558	history1 8 0 8 4 27 1769	history2 9 0 6 1 27 1539
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	Current 7 0 7 <1 23 1558 289	history1 8 0 8 4 27 1769 329	history2 9 0 6 1 27 1539 313
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	Current 7 0 7 <1 23 1558 289 353	history1           8           0           8           4           27           1769           329           386	history2 9 0 6 1 27 1539 313 369 2874
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		Current 7 0 7 <1 23 1558 289 353 2841	history1           8           0           8           4           27           1769           329           386           3309	history2 9 0 6 1 27 1539 313 369 2874
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	current           7           0           7           <1	history1         8         0         8         4         27         1769         329         386         3309         history1         194	history2           9           0           6           1           27           1539           313           369           2874           history2           63
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	Current 7 0 7 <1 23 1558 289 353 2841 Current	history1           8           0           8           4           27           1769           329           386           3309           history1	history2 9 0 6 1 27 1539 313 369 2874 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base >181	current           7           0           7           <1	history1         8         0         8         10         8         4         27         1769         329         386         3309         history1         194         5	history2         9         0         6         1         27         1539         313         369         2874         history2         63         2         2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base >181 >20	current         7         0         7         <1	history1         8         0         8         4         27         1769         329         386         3309         history1         194         5         <1	history2           9           0           6           1           27           1539           313           369           2874           history2           63           2           2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base >181 >20 limit/base	current         7         0         7         <1	history1         8         0         8         4         27         1769         329         386         3309         history1         ▲ 194         5         <1	history2           9           0           6           1           27           1539           313           369           2874           history2           63           2           2           history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base >181 >20 limit/base	current           7           0           7           <1	history1         8         0         8         4         27         1769         329         386         3309         history1         194         5         <1	history2           9           0           6           1           27           1539           313           369           2874           history2           63           2           history2           0
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base >181 >20 limit/base >20	current         7         0         7         <1	history1         8         0         8         4         27         1769         329         386         3309         history1         194         5         <1	history2         9         0         6         1         27         1539         313         369         2874         history2         63         2         history2         0         3.7         16.0
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	Imit/base >181 >20 Imit/base >20 >20 >30	current         7         0         7         <1	history1         8         0         8         4         27         1769         329         386         3309         history1         194         5         <1	history2         9         0         6         1         27         1539         313         369         2874         history2         63         2         history2         0         3.7         16.0
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAD	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m           ASTM D7844           *ASTM D7624           *ASTM D7415           method	limit/base >181 >20 limit/base >20 >30 limit/base	current         7         0         7         <1	history1         8         0         8         4         27         1769         329         386         3309         history1         ▲         194         5         <1         0.1         4.2         18.5	history2         9         0         6         1         27         1539         313         369         2874         history2         63         2         2         history2         0         3.7         16.0         history2

### DIAGNOSIS

### Recommendation

We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

### 🛡 Wear

The iron level is severe. Cylinder, crank, or cam shaft wear is indicated. Valve wear is indicated.

#### Contamination

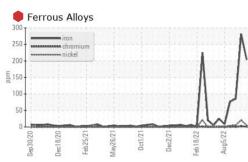
There is no indication of any contamination in the oil.

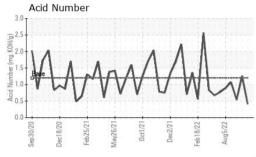
#### Fluid Condition

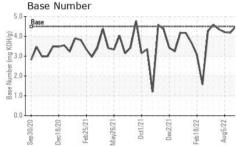
The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid.

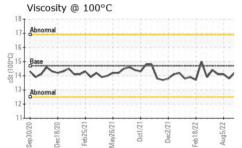


# **OIL ANALYSIS REPORT**









	VISUAL		method	limit/base	current	history1	history2
٨	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
• A	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
117	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
- hu	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
22	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Dec2/21 Feb18/22 Aug5/22	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
	Free Water	scalar	*Visual	>0.1	NEG	NEG	NEG
				limit/booo			
ΛΛ	FLUID PROPERT Visc @ 100°C	cSt	method ASTM D445	limit/base	current	history1 14.0	history2 14.2
	GRAPHS	COL	ASTIM D445	14.7	14.0	14.0	14.2
NMM	Iron (ppm)				Lead (ppm)		
	300 T 122222222222222			1			
Dec2/21 Feb18/22 Aug5/22	250-			Λ.			
Febi	200				0 - Abnormal		
	100		A		5		
120000000000000000000000000000000000000	50 - Aller Billion al		Π.	[		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~
NAM	6/21	0ct1/21	Dec2/21		0/20 8/20 5/21	ay26/21	8/22
	Sep30/20 Dec18/20 Feb25/21 May26/21	Oct	Dec2/21 Feb18/22	20 5 5	Sep30/20 Dec18/20 Feb25/21	May26/21 0ct1/21 Dec2/21	Feb 18/22 Aug5/22
V	Aluminum (ppm)				Chromium (pp	om)	
	12 10				5 Severe		
	8				4 Abnormal		
22	E 6 - Abnormal			A la	3		
Dec2/21 Feb18/22 Aug5/22	4 <b>\</b>		AAA .		2		
		N	~~~~		the	nn	~~
	0/20 8/20 5/21	0ct1/21-	Dec2/21- Feb18/22 -		8/20 -	lay26/21- 0ct1/21- Dec2/21-	-eb18/22 - Aug5/22 -
	Sep30/20 Dec18/20 Feb25/21 May26/21	Oct	Dec Feb1	R 7	Sep30/20 Dec18/20 Feb25/21	May26/21 0ct1/21 Dec2/21	Feb18/22 Aug5/22
	Copper (ppm)				Silicon (ppm)		
A	20 Severe			60 50	<sup>0</sup> T		
mm	15-			40			
	튭10-			 특 30		1	1
	Abnormal			20	- Bittional	AAH/	tott a
Dec2/21 - Feb18/22 - Aug5/22 -	Im	~~	m	▲ <sup>10</sup>		VVVV	MUL
Dec2/21 Feb18/22 Aug5/22	3/20 5/21	1/21+	3/22 -		3/20	6/21- 1/21- 1/21-	3/22 -
	Sep30/20 Dec18/20 Feb25/21 May26/21	0ct1/21	Dec2/21 Feb18/22	7 70 5 7	Sep30/20 Dec18/20 Feb25/21	May26/21 0ct1/21 Dec2/21	Feb18/22 Aug5/22
	Viscosity @ 100°C	2	(700A)		Base Number		97773.
	18 Abnormal	1005/1131		······			
	16			(B)HOH (B) 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.			
	Abnormal	~~~	- An	B 3.		20410	M
				admin 5	0	····· V	V
	12			Z ase	0		
	10 10 10 10 10 10 10 10 10 10	21-	21	0.	0	21-21-21-21-21-21-21-21-21-21-21-21-21-2	22
	Sep30/20 Dec18/20 Feb25/21 May26/21	0ct1/21	Dec2/21 Feb18/22	n n n n n n n n n n n n n n n n n n n	Sep30/20 Dec18/20 Feb25/21	May26/21 0ct1/21 Dec2/21	Feb18/22 Aug5/22
	Mi Fi Di Se		Pe Fe	ч.	ര്വ്ധ്	M	F. A
Laboratory	: WearCheck USA - 5	i01 Madi <b>Receive</b>		ry, NC 2751 Feb 2023			Recips-Co
B Sample No.		DENS POWER STATIO					
Lab Number Unique Number		Diagnos Diagnos		Feb 2023 n Baldridge		5AN	ANTONIO, US 782
Test Package	: MOB 2	Siagilos	uciani . DOI	Datanuye		Contact: AR	
	contact Customer Servi	ice at 1-8	300-237-136	9.		ariel.carrion@	
otes test methods that a	re outside of the ISO 1	7025 sco	ope of accred	litation.			
ents of conformity to speci	itications are based on ti	ha cimnla	accontanco	decision rule i	( ICCM 106-2012)		

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)