

# **OIL ANALYSIS REPORT**

Sample Rating Trend



# Byron Center CAT 2 BYCM02BE

Biogas Engine

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

GAS ENGINE OIL (	,	W2022 JUI202	y2022 Jul2022 Dec2022 Jan2023 Mar2023 Apr2023 Jul2023 Aurg2023							
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2				
Sample Number		Client Info		WC0640324	WC0640327	WC0640321				
Sample Date		Client Info		21 Sep 2023	12 Sep 2023	06 Sep 2023				
Machine Age	hrs	Client Info		103577	103364	103224				
Oil Age	hrs	Client Info		312	96	888				
Oil Changed		Client Info		Not Changd	Changed	Not Changd				
Sample Status				NORMAL	NORMAL	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	3	1	11				
Chromium	ppm	ASTM D5185m	>4	<1	0	<1				
Nickel	ppm	ASTM D5185m	>2	0	0	2				
Titanium	ppm	ASTM D5185m		0	0	0				
Silver	ppm	ASTM D5185m	>5	0	<1	0				
Aluminum	ppm	ASTM D5185m	>6	4	0	5				
Lead	ppm	ASTM D5185m	>9	<1	0	3				
Copper	ppm	ASTM D5185m	>6	2	0	4				
Tin	ppm	ASTM D5185m	>4	3	<1	6				
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		<1	0	<1				
Barium	ppm	ASTM D5185m		0	0	0				
Molybdenum	ppm	ASTM D5185m		2	0	2				
Manganese	ppm	ASTM D5185m		1	0	<1				
Magnesium	ppm	ASTM D5185m		18	10	11				
Calcium	ppm									
Disa availa ave :	1º 1º	ASTM D5185m		1846	1859	2688				
Phosphorus	ppm	ASTM D5185m ASTM D5185m		-	1859 279	2688 392				
Phosphorus Zinc				1846						
•	ppm	ASTM D5185m		1846 280	279	392				
Zinc	ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base	1846 280 319	279 341	392 498				
Zinc Sulfur	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		1846 280 319 3337	279 341 3063	392 498 5313				
Zinc Sulfur CONTAMINANTS	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method		1846 280 319 3337 current	279 341 3063 history1	392 498 5313 history2				
Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	>181	1846 280 319 3337 current 115	279 341 3063 history1 49	392 498 5313 history2 • 253				
Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	>181	1846 280 319 3337 current 115 3	279 341 3063 history1 49 0	392 498 5313 history2 253 2 2				
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 <b>method</b> *ASTM D7844	>181 >20 limit/base	1846 280 319 3337 current 115 3 0 current 0.1	279 341 3063 history1 49 0 <1 <1 history1 0.1	392 498 5313 history2 253 2 2 history2 0.1				
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m Method	>181 >20 limit/base	1846 280 319 3337 current 115 3 0 current	279 341 3063 history1 49 0 <1 kistory1	392 498 5313 history2 253 2 2 2 history2				
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 <b>method</b> *ASTM D7844	>181 >20 limit/base >20	1846 280 319 3337 current 115 3 0 current 0.1	279 341 3063 history1 49 0 <1 <1 history1 0.1	392 498 5313 history2 253 2 2 history2 0.1				
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 <b>method</b> *ASTM D7844 *ASTM D7624	>181 >20 limit/base >20	1846 280 319 3337 current 115 3 0 current 0.1 5.7	279 341 3063 history1 49 0 <1 <1 history1 0.1 5.3	392 498 5313 history2 253 2 2 history2 0.1 6.1 25.0				
Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> *ASTM D7844 *ASTM D7624	>181 >20 limit/base >20 >30	1846 280 319 3337 current 115 3 0 current 0.1 5.7 22.2	279 341 3063 history1 49 0 <1 (1) 0.1 5.3 18.1	392 498 5313 history2 253 2 2 history2 0.1 6.1 25.0				
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 Method *ASTM D7844 *ASTM D7844 *ASTM D7624	>181 >20 limit/base >20 >30 limit/base	1846 280 319 3337 current 115 3 0 current 0.1 5.7 22.2 current	279 341 3063 history1 49 0 <1 istory1 0.1 5.3 18.1 history1	392 498 5313 history2 ● 253 2 2 history2 0.1 6.1 25.0 history2				

### DIAGNOSIS

## Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

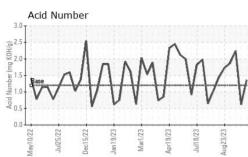
There is no indication of any contamination in the oil.

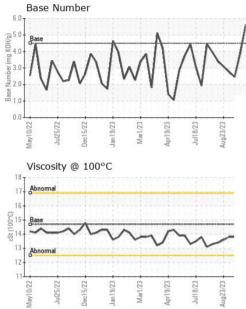
## Fluid Condition

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.



# **OIL ANALYSIS REPORT**





VISUAL		method				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 PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.7	13.8	13.5	13.8
GRAPHS						
Iron (ppm)				Lead (ppm)		
Severe		Tangan	15	Severe		
				- Abnormal		
E 15 - 0		Δ.	- wdd	Å		
		111	5	1 1	INAN	1.
MNN	n	NVV	6	-~~V	WVV	M
0/22 5/22 9/23	1/23	8/23		0/22 5/22 5/22	9/23 11/23	Jul18/23   Aug23/23 -
May <sup>1</sup> Jul2 Dec1	Mai	Apri Jull		Mayi. Jul2 Dec1	Jan1 Mai Apr1	Juli Aug2
Aluminum (ppm)				Chromium (pp	om)	
0			5	Severe		
8			4	Abnormal		
E 6- Abnormal			A Ed 3			
1.100		~^	$\Lambda I^2$			
	V~	V~V	V o		m	m
10/22 25/22 15/22	ar1/23	19/23	5	10/22 25/22	19/23 ar1/23	Jul18/23 Aug23/23
May Jul Dec	Ma	Apr Jul	2 2	May Jul Dec	Jan Ma	Jul
Copper (ppm)			200	Silicon (ppm)		
Severe	1.1.1					
15+			200	- Severe		A.A
				NAT	1/1/1	
5 - Abnormal		~		VVV	VVI	
h	m	~VV	V		VV	
10/22 25/22 15/22	r1/23	8/23		10/22	19/23 r1/23	Jul18/23 - Aug23/23 -
May1 Jul2 Dec1 Jan1	Mai	Apr1 Jul1	2000	May1 Jul2 Dec1	Jan1 Mar Apr1	Jull Aug2
Viscosity @ 100°C				Base Number		
Abnormal		10000000000	6.0 \$	Illineration		
G Base		+	H 5.0	Base	A.A	
	INVII	INV				
ත් Abnormal	~		1 2.0	VVV	1	N
			ଛ 1.0 으			
	1/23	9/23 - 3/23 -	U.U	0/22 - 5/22 -	9/23	8/23 -
May1( Jul25 Dec15 Jan19	Marl	Apr1: Jul16	5 20 20	May1( Jul25 Dec15	Jan15 Mar1 Apr15	Jul18/23 Aug23/23
						•
				Byron Cen		
	Diagnos		Sep 2023 an Felton		Ву	ron Center, N/ US 4931
:10661161						
: 10661161 <b>[</b> : MOB 2	Jugneet				Conta	act: Jake Ripł
	White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water FLUID PROPERT Visc @ 100°C GRAPHS Iron (ppm) 20 4 4 4 0 20 10 0 0 0 0 0 0 0 0 0 0 0 0 0	White Metal scalar Yellow Metal scalar Precipitate scalar Silt scalar Debris scalar Appearance scalar Codor scalar Emulsified Water scalar Free Water scalar Free Water scalar Fullid PROPERTIES Visc @ 100°C cSt GRAPHS Iron (ppm) Copper (ppm) Severe Copper (ppm) Copper (ppm) Coppe	White Metal scalar *Visual Yellow Metal scalar *Visual Precipitate scalar *Visual Debris scalar *Visual Sand/Dirt scalar *Visual Appearance scalar *Visual Codor scalar *Visual Emulsified Water scalar *Visual Free Water scalar *Visual Free Water scalar *Visual Free Water scalar *Visual From (ppm) Copper (ppm) Secret Convey (ppm) Copper	White Metal scalar *Visual NONE Yellow Metal scalar *Visual NONE Silt scalar *Visual NONE Silt scalar *Visual NONE Sand/Dirt scalar *Visual NONE Sand/Dirt scalar *Visual NONE Appearance scalar *Visual NORML Cdor scalar *Visual NORML Emulsified Water scalar *Visual NORML Emulsified Water scalar *Visual Sol 1 Free Water Scalar *Visual Sol 1 Sol 1 Sol 1 WearCheck USA - 501 Madison Ave., Cary, NC 27513 WC0640324 Received : 25 Sep 2023	White Metal scalar *Visual NONE NONE Yellow Metal scalar *Visual NONE NONE Precipitate scalar *Visual NONE NONE Sitt scalar *Visual NONE NONE Sand/Diri scalar *Visual NONE NONE Appearance scalar *Visual NONE NONE Appearance scalar *Visual NORML NORML Odor scalar *Visual NORML NORML Odor scalar *Visual NORML NORML Emulsified Water scalar *Visual NORML NORML Tron (ppm) Auminum (ppm) Aluminum (ppm) Aluminum (ppm) Auminum (ppm) Auminum (ppm) Auminum (ppm) Auminum (ppm) Auminum (ppm) Auminum (ppm) Silicon (ppm) Auminum (ppm)	White Metal scalar 'Visual NONE NONE NONE NONE Yellow Metal scalar 'Visual NONE NONE NONE NONE Precipitate scalar 'Visual NONE NONE NONE NONE Sitt scalar 'Visual NONE NONE NONE NONE Sand/Dirit scalar 'Visual NONE NONE NONE NONE Appearance scalar 'Visual NORML NORML NORML Odor scalar 'Visual NORML NORML NORML Odor scalar 'Visual NORML NORML NORML Precipitate scalar 'Visual NORML

