

## **OIL ANALYSIS REPORT**

Sample Rating Trend



Byron Center CAT 2 BYCM02BE

Biogas Engine

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

A GAS ENGINE OIL ( GAL)									
SAMPLE INFORM	NATION	method	limit/base	current	history1	history2			
Sample Number		Client Info		WC0615047	WC0615045	WC0615010			
Sample Date		Client Info		10 Aug 2023	02 Aug 2023	29 Jul 2023			
Machine Age	hrs	Client Info		102560	102393	102240			
Oil Age	hrs	Client Info		216	48	592			
Oil Changed		Client Info		N/A	Changed	N/A			
Sample Status				NORMAL	NORMAL	ABNORMAL			
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			
		ASTM D5185m	>15	4		13			
Iron Chromium	ppm			-	<1				
	ppm	ASTM D5185m	>4	<1	0	<1			
Nickel	ppm	ASTM D5185m	>2	<1	0	1			
Titanium	ppm	ASTM D5185m	-	0	<1	0			
Silver	ppm	ASTM D5185m	>5	0	0	0			
Aluminum	ppm	ASTM D5185m		3	1	2			
Lead	ppm	ASTM D5185m	>9	<1	<1	3			
Copper	ppm	ASTM D5185m		2	<1	5			
Tin	ppm	ASTM D5185m	>4	3	<1	5			
Vanadium	ppm	ASTM D5185m		0	<1	0			
Cadmium	ppm	ASTM D5185m		0	0	0			
ADDITIVES		method	limit/base	current	history1	history2			
Boron	ppm	ASTM D5185m		0	0	1			
Barium	ppm	ASTM D5185m		0	0	0			
Mailuda al ava com	To be								
Molybdenum	ppm	ASTM D5185m		2	2	5			
,		ASTM D5185m ASTM D5185m		2 <1		5 <1			
Manganese	ppm				2				
Molybdenum Manganese Magnesium Calcium	ppm ppm	ASTM D5185m		<1	2 <1	<1			
Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m		<1 10	2 <1 12	<1 13			
Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		<1 10 1734	2 <1 12 1733	<1 13 1950			
Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 10 1734 273	2 <1 12 1733 259	<1 13 1950 290			
Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	<1 10 1734 273 310	2 <1 12 1733 259 312	<1 13 1950 290 362 4013			
Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 10 1734 273 310 3225	2 <1 12 1733 259 312 2350	<1 13 1950 290 362 4013			
Maganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>		<1 10 1734 273 310 3225 current	2 <1 12 1733 259 312 2350 history1	<1 13 1950 290 362 4013 history2			
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	>181	<1 10 1734 273 310 3225 current 103	2 <1 12 1733 259 312 2350 history1 38	<1 13 1950 290 362 4013 history2 200			
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>181	<1 10 1734 273 310 3225 current 103 2	2 <1 12 1733 259 312 2350 history1 38 1	<1 13 1950 290 362 4013 history2 ▲ 200 0 7			
Maganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>181 >20	<1 10 1734 273 310 3225 current 103 2 2	2 <1 12 1733 259 312 2350 history1 38 1 <1	<1 13 1950 290 362 4013 history2 ▲ 200 0 7			
Magnese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>181 >20 limit/base	<1 10 1734 273 310 3225 current 103 2 2 2 current	2 <1 12 1733 259 312 2350 history1 38 1 <1 <1 history1	<1 13 1950 290 362 4013 history2 200 0 7 history2			
Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	>181 >20 limit/base	<1 10 1734 273 310 3225 current 103 2 2 2 2 current 0	2 <1 12 1733 259 312 2350 history1 38 1 <1 <1 history1 0	<1 13 1950 290 362 4013 history2 ▲ 200 0 7 history2 0.1			
Maganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	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 D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7844	>181 >20 limit/base >20	<1 10 1734 273 310 3225 current 103 2 2 2 current 0 5.5	2 <1 12 1733 259 312 2350 history1 38 1 <1 <1 history1 0 5.1	<1 13 1950 290 362 4013 history2 ▲ 200 0 7 history2 0.1 5.8 26.0			
Magnese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624	>181 >20 limit/base >20 >30	<1 10 1734 273 310 3225 current 103 2 2 2 current 0 5.5 19.9	2 <1 12 1733 259 312 2350 history1 38 1 <1 <1 history1 0 5.1 16.4	<1 13 1950 290 362 4013 history2 ▲ 200 0 7 history2 0.1 5.8			
Magnese Magnesium Calcium Phosphorus 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 D5185m ASTM D5185m *ASTM D7844 *ASTM D7844 *ASTM D7644 *ASTM D7414	>181 >20 limit/base >20 >30 limit/base	<1 10 1734 273 310 3225 current 103 2 2 2 current 0 5.5 19.9 current	2 <1 12 1733 259 312 2350 history1 38 1 <1 <1 history1 0 5.1 16.4 history1	<1 13 1950 290 362 4013 history2 200 0 7 history2 0.1 5.8 26.0 history2			

### DIAGNOSIS

## Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

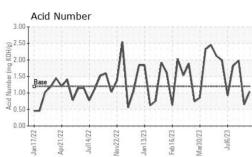
There is no indication of any contamination in the oil.

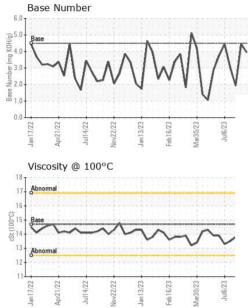
### Fluid Condition

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.



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	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
1111111	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
V V I F V	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Jan 13/23 Feb 16/23 Mar30/23 Jul6/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Jan Feb Ju	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
	Free Water	scalar	*Visual		NEG	NEG	NEG
<u> </u>	FLUID PROPER	<b>FIES</b>	method	limit/base	current	history1	history2
MALLAT	Visc @ 100°C	cSt	ASTM D445	14.7	13.3	13.1	13.8
1 vv v I V	GRAPHS						
	Iron (ppm)			11	Lead (ppm)		
	25 Severe			15	Severe		
Jan 13/23 Feb 16/23 Mar30/23 Jul6/23	20 - Abnormal			10	Abnormal		
Per N	E 15 - Abnormal					A	. N
	5			1		10 M	$\Lambda \Lambda$
	-m	vv	M	V		VN NV	VV
	Jan17/22 - Apr21/22 - Jul14/22 -	Jan 13/23 -	Feb16/23 - Mar30/23 -		Jan17/22 - Apr21/22 - Jul14/22 -	Vov22/22 - Jan13/23 - Feb16/23 -	Mar30/23 - Jul6/23 -
	Jani Aprź Juli Nov2	Jan1	Mar		Jani Apr2 Jul1	Novi Jan1 Feb1	Marć
ma	Aluminum (ppm)				Chromium (pp	m)	
	12 Severe				Severe		
	8				Abnormal		
23 - 23 - 23 - 23 - 23 - 23 - 23 - 23 -	E 6- Abnormal			udd	3		
Jan 13/23 Feb 16/23 Mar30/23 Jul6/23	4				2		
		N	M	N	L	200	~~~
	1/22	3/23	eb 16/23		1/22	2/22 3/23	ar30/23
	Jan 17/22 Apr21/22 Jul 14/22	Jan 13/23	Feb16/23 Mar30/23		Jan 17/22 Apr21/22 Jul 14/22	Nov22/22 Jan 13/23 Feb 16/23	Mar30/23 Jul6/23
	Copper (ppm)				Silicon (ppm)		
	20 T		11111111	250	Tannon processing.	11111111111111111	100000000000000000000000000000000000000
	15 - Severe			200	- Severe	A	- 11
	튭 10-			E 150	MAR	MAN	1111
	Abnorma			<sup>-</sup> 100	1.MM	V V V V	V/ VV
	1 Jhr	100	10-	50			VV
		53	23 23	(	22	22 - 23 - 23 - 23 - 23 - 23 - 23 - 23 -	23 -
	Jan 17/22 Apr21/22 Jul 14/22 Nov22/22	Jan 13/23	Feb16/23 Mar30/23		Jan17/22 Apr21/22 Jul14/22	Nov22/22 Jan 13/23 Feb 16/23	Mar30/23 Jul6/23
	Viscosity @ 100°C		A N		Base Number	2 7 4	2
	18 -	1000,000,000	12222000000000000	<u>-</u> 6.0	) <del>-</del>		
	Abnormal			(0/HO) 5.( HO) HO) 5.( Junual 2.( Bas Number 1.( Bas 1.(	Base		A
	Co Base Abnormal			DB 4.0		AN	MAN
	e 14 정 Abnormal	-~		✓ la 3.0 m 2.0		WWW	VI/V
				≥ 2.0 8g 1.0	)-		· V ·
	12-			60	a construction		
	12		m m m	0.0		3 3	m m
	12	n13/23	b16/23	0.0		v22/22 + n13/23 +	ar30/23 -
	12	Jan 13/23	Feb16/23	0.0	Jan 17/22 Apr21/22 Jul 14/22	Nov22/22 - Jan13/23 - Feb16/23 -	Mar30/23 - Jul6/23 -
l aboratory	Jan 17/22 Apr21/22 Jult 4/22 Nov22/22		H 2	0.0	Jan 17/22 Apr21/22 Jui 14/22		2
Laboratory Sample No.	22/10 22/11/10 22/12/10 22/11/10 22/11/10 22/11/10 22/11/10 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 22/20/00 20/20/20 20/20 20/20		∽≥ son Ave., Ca	0.0	Jan17/22 Apr21/22 Jul14/22	DL NA Recips er Powerstation, 103	≥ -Byron Cente
Sample No. Lab Number	: WearCheck USA - 4 : WC0615047 : 05922392	501 Madis Received Diagnos	son Ave., Ca a : 11 / ed : 14 /	ry, NC 27513 Aug 2023 Aug 2023	Jan17/22 Apr21/22 Jul14/22	DL NA Recips er Powerstation, 103	≥ -Byron Cente 10 South Kent Roa yron Center, M
Sample No. Lab Number Unique Number	: WearCheck USA - 5 : WC0615047 : 05922392 r : 10602339	501 Madis <b>Received</b>	≝ ≥ son Ave., Ca d : 11 / ed : 14 /	ry, NC 2751: Aug 2023	Jan17/22 Apr21/22 Jul14/22	DL NA Recips er Powerstation, 103 By	■ Byron Center 10 South Kent Roa yron Center, M US 4931
Sample No. Lab Number	: WearCheck USA - 3 : WC0615047 : 05922392 r : 10602339 e : MOB 2	501 Madia Received Diagnose Diagnose	son Ave., Ca d : 11 / ed : 14 / tician : Dor	ry, NC 27513 Aug 2023 Aug 2023 n Baldridge	Jan17/22 Apr21/22 Jul14/22	DL NA Recips er Powerstation, 103 By Conta	≥ -Byron Cente 10 South Kent Roa yron Center, N

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