

# **OIL ANALYSIS REPORT**





## Component

Diesel Engine Fluid CHEVRON DELO 400 XLE 15W40 (--- GAL)

### 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

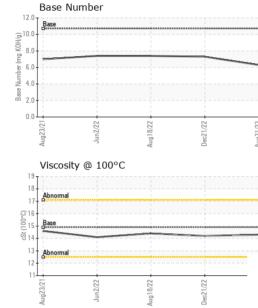
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0084515	GFL0064716	GFL0018778
Sample Date		Client Info		21 Aug 2023	21 Dec 2022	18 Aug 2022
Machine Age	hrs	Client Info		21389	23785	19785
Oil Age	hrs	Client Info		610	600	589
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	29	32	20
Chromium	ppm	ASTM D5185m		1	2	2
Nickel	ppm	ASTM D5185m		0	<1	0
Titanium	ppm	ASTM D5185m		14	5	1
Silver	ppm	ASTM D5185m	>3	0	0	<1
Aluminum	ppm	ASTM D5185m	>20	1	4	4
Lead	ppm	ASTM D5185m	>40	29	20	26
Copper	ppm	ASTM D5185m	>330	2	2	2
Tin	ppm	ASTM D5185m	>15	1	2	<1
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method				history2
Boron	ppm	Method ASTM D5185m	limit/base	current 51	history1 78	history2 78
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	51	78	78
Boron Barium Molybdenum Manganese	ppm	ASTM D5185m ASTM D5185m	limit/base	51 2	78 0	78 0 110 <1
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	51 2 54	78 0 90	78 0 110
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	51 2 54 <1 780 1737	78 0 90 <1	78 0 110 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	760	51 2 54 <1 780 1737 806	78 0 90 <1 610 1665 787	78 0 110 <1 594 1574 661
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	760 830	51 2 54 <1 780 1737 806 954	78 0 90 <1 610 1665 787 988	78 0 110 <1 594 1574 661 841
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	760 830	51 2 54 <1 780 1737 806	78 0 90 <1 610 1665 787	78 0 110 <1 594 1574 661
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	760 830	51 2 54 <1 780 1737 806 954	78 0 90 <1 610 1665 787 988	78 0 110 <1 594 1574 661 841
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	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	760 830 2770 limit/base	51 2 54 <1 780 1737 806 954 3263	78 0 90 <1 610 1665 787 988 3391	78 0 110 <1 594 1574 661 841 2446
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	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	760 830 2770 limit/base	51 2 54 <1 780 1737 806 954 3263 current	78 0 90 <1 610 1665 787 988 3391 history1	78 0 110 <1 594 1574 661 841 2446 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	760 830 2770 limit/base	51 2 54 <1 780 1737 806 954 3263 <i>current</i> 26	78 0 90 <1 610 1665 787 988 3391 history1 6	78 0 110 <1 594 1574 661 841 2446 history2 6
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	760 830 2770 limit/base >25	51 2 54 <1 780 1737 806 954 3263 <u>current</u> 26 3	78 0 90 <1 610 1665 787 988 3391 history1 6 8	78 0 110 <1 594 1574 661 841 2446 history2 6 10
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	760 830 2770 limit/base >25 >20	51 2 54 <1 780 1737 806 954 3263 <i>current</i> 26 3 5	78 0 90 <1 610 1665 787 988 3391 history1 6 8 8 2	78 0 110 <1 594 1574 661 841 2446 history2 6 10 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	760 830 2770 limit/base >25 >20 limit/base >3	51 2 54 <1 780 1737 806 954 3263 current 26 3 5 5	78 0 90 <1 610 1665 787 988 3391 history1 6 8 2 2 history1	78 0 110 <1 594 1574 661 841 2446 history2 6 10 2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	760 830 2770 limit/base >25 >20 limit/base >3	51 2 54 <1 780 1737 806 954 3263 <i>current</i> 26 3 5 <i>current</i> 1	78 0 90 <1 610 1665 787 988 3391 history1 6 8 2 2 history1 1	78 0 110 <1 594 1574 661 841 2446 history2 6 10 2 history2 1.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	760 830 2770 limit/base >25 >20 limit/base >3 >20	51 2 54 <1 780 1737 806 954 3263 <u>current</u> 26 3 5 <u>current</u> 1 11.6	78 0 90 <1 610 1665 787 988 3391 history1 6 8 2 2 history1 1 1 13.1	78 0 110 <1 594 1574 661 841 2446 history2 6 10 2 history2 1.1 1.1 13.7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	760 830 2770 imit/base >25 >20 imit/base >3 >20 >3 >20	51 2 54 <1 780 1737 806 954 3263 <u>current</u> 26 3 5 <u>current</u> 1 11.6 25.5	78 0 90 <1 610 1665 787 988 3391 history1 6 8 2 <u>history1</u> 1 1 13.1 27.5	78 0 110 <1 594 1574 661 841 2446 history2 6 10 2 history2 1.1 1.1 13.7 29.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844	760 830 2770 imit/base >25 20 imit/base >3 >20 >30 >30	51 2 54 <1 780 1737 806 954 3263 Current 26 3 5 Current 1 11.6 25.5 Current	78 0 90 <1 610 1665 787 988 3391 history1 6 8 2 history1 1 13.1 27.5 history1	78 0 110 <1 594 1574 661 841 2446 history2 6 10 2 history2 1.1 1.3.7 29.4 history2



# **OIL ANALYSIS REPORT**

VISUAL



		White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
		Yellow Metal		*Visual	NONE	NONE	NONE	NONE
		Precipitate		*Visual	NONE	NONE	NONE	NONE
		Silt		*Visual	NONE	NONE	NONE	NONE
		Debris		*Visual	NONE	NONE	NONE	NONE
		Sand/Dirt		*Visual	NONE	NONE	NONE	NONE
8/22	1/22 -			*Visual	NORML	NORML	NORML	NORML
Aug18/22	Dec21/22 Aug21/23	Odor		*Visual	NORML	NORML	NORML	NORML
		Emulsified Water		*Visual	>0.2	NEG	NEG	NEG
		Free Water		*Visual		NEG	NEG	NEG
		FLUID PROPE		method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445	14.9	14.3	14.2	14.4
		GRAPHS						
		Ferrous Alloys						
22	22	iron						
Aug18/22	Dec21/22	30 - nickel						
Aı		25	$\leq$					
		E 20 -	Y					
		15-						
		10						
		5						
			5	2	·····			
		Aug23/21 Jun2/22	Aug18/22	Dec21/22	Aug21/23			
		4		Der	Aug			
		Non-ferrous Meta	ils					
		copper			And a state of the			
		25 - management lead	and the second s					
		20-	and the second se	and a state of the				
		u 4						
		10						
		5						
			Restanting periods and the same					
		Aug23/21 Jun2/22	Aug18/22	Dec21/22	Aug21/23			
		Aug	Aug	Dec	Aug			
		Viscosity @ 100°	С			Base Number		
		<sup>19</sup> 18	C		12.0	Base Number		
		19 18 17 <b>Abnormal</b>	C		10.0			
		19 18 17 <b>Abnormal</b>	C		10.0			
		19 18 17 <b>Abnormal</b>	C		10.0			
		Abnormal Abnormal Base 3 14 Base	C		10.0			
		Abnormal Abnormal Base Base Base Abnormal Abnormal Abnormal	C		10.0- (b)HO3 8.0- bat (mg KOH(d) Base Mumb 4.0-			
		19 18 17 Abnomal 16 5 16 15 8 14 13 Abnomal 13 Abnomal	C		10.0- 10)HO 8.0- 10)HO 80- 10)HO 80- 10)HO 80- 10,HO 80-			
		Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal		22	10.0 (M) W KOH (0) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	Base	22	22
		Abnormal Abnormal Abnormal Abnormal Abnormal Abnormal		25/1/29-	10.0 (M) W KOH (0) (M) (M) (M) (M) (M) (M) (M) (M) (M) (M	Base	4ug 16/22	bec21/22
		Abnormal Abnormal Abnormal Abnormal 11 12 11 12 11 12 12 11 12 12	Aug18/22	Dec21/22	-0.01 -0.0 (0) -0.0 Bases Mumber (mg KOH(0) -0.0 Bases Virunder (mg KOH(0) -0.0 C	Aug 23/21	Aug18/22	
4	Laboratory Sample No.	Abnormal Abnormal Abnormal Abnormal CZZZUN CZU	2208 lbmy 501 Madis	on Ave., Ca	(0)HOX BU 3-900 10.0- 10,HOX BU 3-900 10,0- 10,	Aug 23/21	ironmental - 62	29 - Northern A
	Sample No.	Abnormal Abnormal Abnormal Abnormal Cool 35 Abnormal Cool 35 Abnormal Cool 35 Abnormal Cool 35 Abnormal Cool 35 Cool 3	501 Madis Received	on Ave., Ca : 24 /	10.0- (0)HOX BU 3-900 10.0-	Aug 23/21	ironmental - 62	29 - Northern A 3947 US 131
	Sample No. Lab Number	Abnormal Abnormal Abnormal Abnormal CZCUN CZCU	501 Madis Received Diagnose	on Ave., Ca : 24 / d : 25 /	(0)HOX BU 3-900 10.0- 10,HOX BU 3-900 10,0- 10,	Aug 23/21	ironmental - 62	29 - Northern A
trificate L2367	Sample No.	Abnormal Abnormal Abnormal Abnormal CZCZUN	501 Madis Received	on Ave., Ca : 24 / d : 25 /	10.0- 10	GFL Env	ironmental - 62	2 <b>9 - Northern /</b> 3947 US 131 Kalkaska, I JS 49646-842

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