

# **OIL ANALYSIS REPORT**

## Sample Rating Trend





422024-402273

Component **Diesel Engine** 

CHEVRON DELO 400 MULTIGRADE 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

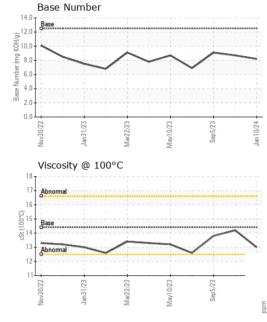
## **Fluid Condition**

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

Sample Number   Client Info   GFL0025058   GFL0098454   GFL00865   Sample Date   Client Info   10 Jan 2024   O7 Nov 2023   05 Sep 20 Machine Age   hrs   Client Info   3249   3119   2996	11G11ADE 15W40 (-	GAL)	Nov2022	Jan2023 Mar2023	May2023 Sep2023	Jan 2024	
Sample Date   Client Info   3249   3119   2996	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age   hrs   Client Info   3249   3119   2996	Sample Number		Client Info		GFL0025058	GFL0098454	GFL0086323
Oil Age	Sample Date		Client Info		10 Jan 2024	07 Nov 2023	05 Sep 2023
Coli   Changed   Client Info   N/A   NORMAL   NORMAL	Machine Age	hrs	Client Info		3249	3119	2996
NORMAL   NORMAL   NORMAL   NORMAL   CONTAMINATION   method   limit/base   current   history1   history1   history1   history1   water   Wc Method   NEG   NEG	Oil Age	hrs	Client Info		825	695	572
CONTAMINATION         method         limit/base         current         history1         history1           Fuel         WC Method         >3.0         <1.0	Oil Changed		Client Info		N/A	N/A	Not Changd
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
Water Glycol         WC Method         >0.2         NEG NEG         NEG NEG           WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         >120         11         6         3           Chromium         ppm         ASTM D5185m         >20         <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         >120         11         6         3           Chromium         ppm         ASTM D5185m         >20         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Pron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1         <1         0           Nickel         ppm         ASTM D5185m         >5         5         0         <1           Titanium         ppm         ASTM D5185m         >2         0         0         0           Silver         ppm         ASTM D5185m         >2         0         <1         0           Aluminum         ppm         ASTM D5185m         >20         4         2         <1           Lead         ppm         ASTM D5185m         >40         0         <1         0           Copper         ppm         ASTM D5185m         >330         12         <1         7           Tin         ppm         ASTM D5185m         >15         <1         0         <1           Vanadium         ppm         ASTM D5185m         <1         0         <1         0         <1           Cadmium         ppm         ASTM D5185m         <1         0         <1         0         <1           ADDITIVES         method         limit/base         current         history1         history1         history1           Barium         ppm         ASTM D5185m <td>WEAR METAL</td> <td>S</td> <td>method</td> <td>limit/base</td> <th>current</th> <td>history1</td> <td>history2</td>	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	11	6	3
Description	Chromium	ppm	ASTM D5185m	>20	<1	<1	0
Silver	Nickel	ppm	ASTM D5185m	>5	5	0	<1
Aluminum	Titanium	ppm	ASTM D5185m	>2	0	0	0
Lead	Silver	ppm	ASTM D5185m	>2	0	<1	0
Copper         ppm         ASTM D5185m         >330         12         <1         7           Tin         ppm         ASTM D5185m         >15         <1	Aluminum	ppm	ASTM D5185m	>20	4	2	<1
Tin	Lead	ppm	ASTM D5185m	>40	0	<1	0
Vanadium         ppm         ASTM D5185m         <1         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         151         55         88         104           Barium         ppm         ASTM D5185m         0.4         0         6         0           Molybdenum         ppm         ASTM D5185m         250         74         73         76           Manganese         ppm         ASTM D5185m         250         74         73         76           Manganesium         ppm         ASTM D5185m         250         74         73         76           Manganesium         ppm         ASTM D5185m         0         874         819         919           Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         >2012         2990 <th< td=""><td>Copper</td><td>ppm</td><td>ASTM D5185m</td><td>&gt;330</td><th>12</th><td>&lt;1</td><td>7</td></th<>	Copper	ppm	ASTM D5185m	>330	12	<1	7
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         151         55         88         104           Barium         ppm         ASTM D5185m         0.4         0         6         0           Molybdenum         ppm         ASTM D5185m         250         74         73         76           Manganese         ppm         ASTM D5185m         250         74         73         76           Magnesium         ppm         ASTM D5185m         0         874         819         919           Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         943         1141         1101         1150           Silicon         ppm         ASTM D5185m         >225         6         4         4           Sodium         ppm         ASTM D5185m         >225         6 <td>Tin</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;15</td> <th>&lt;1</th> <td>0</td> <td>&lt;1</td>	Tin	ppm	ASTM D5185m	>15	<1	0	<1
ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         151         55         88         104           Barium         ppm         ASTM D5185m         0.4         0         6         0           Molybdenum         ppm         ASTM D5185m         250         74         73         76           Manganese         ppm         ASTM D5185m         250         74         73         76           Magnesium         ppm         ASTM D5185m         20         1         0         <1	Vanadium	ppm	ASTM D5185m		<1	0	<1
Boron	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         0.4         0         6         0           Molybdenum         ppm         ASTM D5185m         250         74         73         76           Manganese         ppm         ASTM D5185m         250         74         73         76           Magnesium         ppm         ASTM D5185m         0         874         819         919           Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         >20         2         3         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         250         74         73         76           Manganese         ppm         ASTM D5185m         <1         0         <1           Magnesium         ppm         ASTM D5185m         0         874         819         919           Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         1043         947         954         961           Zinc         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         >20         2         3         <1           INFRA-RED         method         limit/base         current         history1         history1           Soot %         %         *ASTM D7624	Boron	ppm	ASTM D5185m	151	55	88	104
Manganese         ppm         ASTM D5185m         <1         0         <1           Magnesium         ppm         ASTM D5185m         0         874         819         919           Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         1043         947         954         961           Zinc         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         >20         2         3         <1	Barium	ppm	ASTM D5185m	0.4	0	6	0
Magnesium         ppm         ASTM D5185m         0         874         819         919           Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         1043         947         954         961           Zinc         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history1         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         >20         2         3         <1	Molybdenum	ppm	ASTM D5185m	250	74	73	76
Calcium         ppm         ASTM D5185m         2046         1176         1113         1256           Phosphorus         ppm         ASTM D5185m         1043         947         954         961           Zinc         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1	Manganese	ppm	ASTM D5185m		<1	0	<1
Phosphorus         ppm         ASTM D5185m         1043         947         954         961           Zinc         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         histor           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1           INFRA-RED         method         limit/base         current         history1         history1         history1           Soot %         %         *ASTM D7844         >4         0.3         0.4         0.1           Nitration         Abs/cm         *ASTM D7624         >20         7.3         5.8         4.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.3         19.2         18.4           FLUID DEGRADATION         *ASTM D7414	Magnesium	ppm	ASTM D5185m	0	874	819	919
Zinc         ppm         ASTM D5185m         943         1141         1101         1150           Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         >20         2         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1           INFRA-RED         method         limit/base         current         history1         history1           Soot %         %         *ASTM D7844         >4         0.3         0.4         0.1           Nitration         Abs/cm         *ASTM D7624         >20         7.3         5.8         4.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.3         19.2         18.4           FLUID DEGRADATION         method         limit/base         current         history1         history1           Oxidation	Calcium	ppm	ASTM D5185m	2046	1176	1113	1256
Sulfur         ppm         ASTM D5185m         5012         2990         3183         3626           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1	Phosphorus	ppm	ASTM D5185m	1043	947	954	961
CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1	Zinc	ppm	ASTM D5185m	943	1141	1101	1150
Silicon         ppm         ASTM D5185m         >25         6         4         4           Sodium         ppm         ASTM D5185m         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1           INFRA-RED         method         limit/base         current         history1         history1         history1           Soot %         %         *ASTM D7844         >4         0.3         0.4         0.1           Nitration         Abs/cm         *ASTM D7624         >20         7.3         5.8         4.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.3         19.2         18.4           FLUID DEGRADATION         method         limit/base         current         history1         history1           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.0         13.7         13.7	Sulfur	ppm	ASTM D5185m	5012	2990	3183	3626
Sodium         ppm         ASTM D5185m         3         0         3           Potassium         ppm         ASTM D5185m         >20         2         3         <1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         2         3         <1           INFRA-RED         method         limit/base         current         history1         history1           Soot %         %         *ASTM D7844         >4         0.3         0.4         0.1           Nitration         Abs/cm         *ASTM D7624         >20         7.3         5.8         4.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.3         19.2         18.4           FLUID DEGRADATION         method         limit/base         current         history1         history1           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.0         13.7         13.7	Silicon	ppm	ASTM D5185m	>25	6	4	4
INFRA-RED	Sodium	ppm	ASTM D5185m		3	0	3
Soot %         %         *ASTM D7844 >4         0.3         0.4         0.1           Nitration         Abs/cm         *ASTM D7624 >20         7.3         5.8         4.9           Sulfation         Abs/.1mm         *ASTM D7415 >30         19.3         19.2         18.4           FLUID DEGRADATION method limit/base current         history1         history1         history1           Oxidation         Abs/.1mm         *ASTM D7414 >25         15.0         13.7         13.7	Potassium	ppm	ASTM D5185m	>20	2	3	<1
Nitration         Abs/cm         *ASTM D7624         >20         7.3         5.8         4.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.3         19.2         18.4           FLUID DEGRADATION method limit/base current         history1         history1         history           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.0         13.7         13.7	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         19.3         19.2         18.4           FLUID DEGRADATION method limit/base current         bistory1         history1         history1         history1         13.7           Oxidation         Abs/.1mm         *ASTM D7414         >25         15.0         13.7         13.7	Soot %	%	*ASTM D7844	>4	0.3	0.4	0.1
FLUID DEGRADATION     method     limit/base     current     history1     history1       Oxidation     Abs/.1mm     *ASTM D7414     >25     15.0     13.7     13.7	Nitration	Abs/cm	*ASTM D7624	>20	7.3	5.8	4.9
Oxidation Abs/.1mm *ASTM D7414 >25 <b>15.0</b> 13.7 13.7	Sulfation	Abs/.1mm	*ASTM D7415	>30	19.3	19.2	18.4
	FLUID DEGRAD	NOITAC	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g   ASTM D2896   12.5   8.2   8.7   9.1	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.0	13.7	13.7
, , ,	Base Number (BN)	mg KOH/g	ASTM D2896	12.5	8.2	8.7	9.1



## **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
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	RTIFS	method	limit/base	current	historv1	historv2

FLUID PROP	ERTIES	method	limit/base	current	hist	ory1	histo	ry2
Visc @ 100°C	cSt	ASTM D445	14.4	13.0	14.2		13.8	
GRAPHS								
Iron (ppm)			100	Lead (ppm)				
250 Severe			80	Covere				
200 - Abnormal			E 60					
Abnormal 100			40					-
0			20	1: : :				
Nov30/22 -	Mar22/23 -	Sep5/23.	Jan 10/24 .	Vov30/22	Mar22/23 -	May10/23	Sep5/23	Jan 10/24
_		8	Jan	_	_	May	Š	Jan
Aluminum (ppm	) 		50	Chromium (p	pm)			
40+			40			-		
Abnormal			= 30 E 20	Abnormal				
10			10					
0 2 2	3		<b>=</b>		33			-
Nov30/22 Jan31/23	Mar22/23 May10/23	Sep5/23	Jan 10/24	Nov30/22 Jan31/23	Mar22/23	May10/23	Sep5/23	Jan 10/24
Copper (ppm)	2 2		7	Silicon (ppm)	2	>		7
400 Severe								
300			60	1: : :				
200			트 40	Abnormal				
100			20					
23	23	-23	24		23	- 52	23	24
Nov30/22 Jan31/23	Mar22/23 May10/23	Sep5/23	Jan 10/24	Nov30/22 Jan31/23	Mar22/23	May10/23	Sep5/23	Jan 10/24
Viscosity @ 100				Base Number	-			
Abnormal			15.0 10.0 10.0	Base				
16 Base			¥ 10.0		^		_	

0.0





Certificate L2367

Laboratory Sample No. Lab Number Unique Number : 10833766 Test Package : MOB1+

: GFL0025058 : 06062384

:St (100°C)

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Recieved

: 17 Jan 2024 Diagnosed : 18 Jan 2024 Diagnostician : Sean Felton

May10/23

GFL Environmental - 180 - Tuscaloosa Hauling 4701 12TH ST NE

Tuscaloosa, AL US 35404

Contact: FREDERICK ROGERS

fred.rogers@gflenv.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)

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