

OIL ANALYSIS REPORT

Sample Rating Trend





EX0069-323

Component Diesel Engine Fluid

CHEVRON DELO 400 XLE 15W40 (--- GAL)

Sample Number Client Info GFL0097489 GFL0097486 GFL009283 Sample Date Client Info 01 Mar 2024 27 Nov 2023 08 Aug 202 Machine Age hrs Client Info 6545 6545 6545 Oil Age hrs Client Info 6545 6545 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method imit/base current history1 history1 Fuel WC Method >0.1 NEG NEG NEG Water WC Method NeG NEG NEG NeG Iron ppm ASTM0585m<>10 <1 0 0 1 Nickel ppm ASTM0585m<>20 0 0 0 1 Vickel ppm ASTM0585m<>20 0 0 1 0 1 1 0 0	XLE 15W40 (GAL)	Jun2021	Jun2023	Aug2023 Nov2023	Mar2024	
Sample Date Client Info 01 Mar 2024 27 Nov 2023 08 Aug 202 Machine Age hrs Client Info 6545 6545 6545 0 Oil Age hrs Client Info 6545 6545 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status Imit/base current history1 history1 Fuel WC Method >6.0 <1.0 <1.0 <1.0 Water WC Method >6.0 1.0G NEG NEG NEG Iron ppm ASTM D5185m >100 6 10 6 Chromium ppm ASTM D5185m >10 <1 0 0 Iron ppm ASTM D5185m >10 7 5 5 5 Lead ppm ASTM D5185m >10 7 5 5 5 Lead ppm ASTM D5185m 10 7 1 1 </th <th>SAMPLE INFO</th> <th>RMATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFO	RMATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 6545 6545 6545 Oil Age hrs Client Info N/A N/A N/A Sample Status NORMAL NORMAL NORMAL NORMAL COUTAMINATION method limit/base current history1 history1 Fuel WC Method >6.0 <1.0	Sample Number		Client Info		GFL0097489	GFL0097466	GFL009292
Oil Age hrs Client Info 6545 6545 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method imit/base current history1 history1 Fuel WC Method 56.0 <1.0	Sample Date		Client Info		01 Mar 2024	27 Nov 2023	08 Aug 2023
Oil Changed Client Info N/A N/A N/A Sample Status Info N/A NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method >0.1 NEG NEG NEG Glycol WC Method >0.1 NEG NEG NEG Water WC Method NEG NEG NEG NEG Wear ppm ASTM D5185m >10 <1	Machine Age	hrs	Client Info		6545	6545	6545
Sample Status NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method >6.0 <1.0 <1.0 <1.0 <1.0 Water WC Method >0.1 NEG NEG NEG NEG Glycol WC Method >0.0 6 10 6 Uran ppm ASTM D5185m<>10 <10 0 0 Iron ppm ASTM D5185m<>10 <1 0 0 Nickel ppm ASTM D5185m<>10 <1 0 0 Silver ppm ASTM D5185m<>10 <1 0 0 Auminum ppm ASTM D5185m<>10 <1 <1 <1 <1 Vanadlum ppm ASTM D5185m<>10 <1 <1 <1 <1 Vanadlum ppm ASTM D5185m <10 <1 <1 <1 <1< <1 Vana	Oil Age	hrs	Client Info		6545	6545	0
CONTAMINATION method limit/base current history1 history1 Fuel WC Method >6.0 <1.0	Oil Changed		Client Info		N/A	N/A	N/A
Fuel WC Method >6.0 <1.0 <1.0 <1.0 <1.0 <1.0 Water WC Method >0.1 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG WeAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >10 <1	Sample Status				NORMAL	NORMAL	NORMAL
Water WC Method >0.1 NEG NEG NEG NEG Glycol WC Method MEG NEG NEG NEG Wear ppm ASTM D5185m >100 6 10 6 Chromium ppm ASTM D5185m >10 <1	CONTAMINA	TION	method	limit/base	current	history1	history2
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >100 6 10 6 Chromium ppm ASTM D5185m >10 <1	Fuel		WC Method	>6.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >100 6 10 6 Chromium ppm ASTM D5185m >10 <1	Water		WC Method	>0.1	NEG	NEG	NEG
Iron ppm ASTM D5185m >100 6 10 6 Chromium ppm ASTM D5185m >10 <1	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >10 <1 0 <1 Nickel ppm ASTM D5185m >10 <1	WEAR META	LS	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >10 <1 0 0 Titanium ppm ASTM D5185m <1	Iron	ppm	ASTM D5185m	>100	6	10	6
Titanium ppm ASTM D5185m <1 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >10 7 5 5 Lead ppm ASTM D5185m >20 0 0 <11	Chromium	ppm	ASTM D5185m	>10	<1	0	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >10 7 5 5 Lead ppm ASTM D5185m >20 0 0 <1	Nickel	ppm	ASTM D5185m	>10	<1	0	0
Aluminum ppm ASTM D5185m >10 7 5 5 Lead ppm ASTM D5185m >20 0 0 <1	Titanium	ppm	ASTM D5185m		<1	0	0
Lead ppm ASTM D5185m >20 0 0 <1 Copper ppm ASTM D5185m >15 6 8 5 Tin ppm ASTM D5185m >10 <1	Silver	ppm	ASTM D5185m	>2	0	0	
Copper ppm ASTM D5185m >15 6 8 5 Tin ppm ASTM D5185m >10 <1	Aluminum	ppm	ASTM D5185m	>10	7	5	5
Tin ppm ASTM D5185m >10 <1 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 0 Maganese ppm ASTM D5185m 64 526 534 54 Phosphorus ppm ASTM D5185m 1993 1765 1824 Phosphorus ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current		ppm	ASTM D5185m	>20	0	0	<1
Vanadium ppm ASTM D5185m <1 0 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 137 33 42 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 4 41 42 Manganese ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 270 3466 2779 3416 CONTAMINANTS method limit/base current history1 history1 Soliton ppm	Copper	ppm	ASTM D5185m	>15	6	8	5
Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 137 33 42 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 4 41 42 Manganese ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 1993 1765 1824 Phosphorus ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method imit/base current history1 history1 Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm	Tin	ppm	ASTM D5185m	>10	<1	<1	<1
ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 137 33 42 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 4 41 42 Manganese ppm ASTM D5185m 0 0 <1	Vanadium	ppm	ASTM D5185m		<1	0	<1
Boron ppm ASTM D5185m 137 33 42 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 4 41 42 Manganese ppm ASTM D5185m 0 0 0 <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 4 41 42 Manganese ppm ASTM D5185m 0 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 4 41 42 Manganese ppm ASTM D5185m 0 0 <1	Boron	ppm	ASTM D5185m		137		42
Manganese ppm ASTM D5185m 0 0 <1 Magnesium ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 1993 1765 1824 Phosphorus ppm ASTM D5185m 1993 1765 1824 Phosphorus ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 760 909 928 945 Sulfur ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 8 0 <1	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 64 526 534 Calcium ppm ASTM D5185m 1993 1765 1824 Phosphorus ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 830 1127 1170 1189 Sulfur ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 8 0 <1	Molybdenum	ppm	ASTM D5185m		4		42
Calcium ppm ASTM D5185m 1993 1765 1824 Phosphorus ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 830 1127 1170 1189 Sulfur ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 8 0 <1 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7414 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current </td <td>Manganese</td> <td>ppm</td> <td></td> <td></td> <td>0</td> <td>0</td> <td><1</td>	Manganese	ppm			0	0	<1
Phosphorus ppm ASTM D5185m 760 909 928 945 Zinc ppm ASTM D5185m 830 1127 1170 1189 Sulfur ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 8 0 <1 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/.1mm *ASTM D7415 30 <td>Magnesium</td> <td>ppm</td> <td></td> <td></td> <td>64</td> <td>526</td> <td>534</td>	Magnesium	ppm			64	526	534
Zinc ppm ASTM D5185m 830 1127 1170 1189 Sulfur ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m 22 2 3 Potassium ppm ASTM D5185m >20 8 0 <1	Calcium	ppm	ASTM D5185m		1993	1765	1824
Sulfur ppm ASTM D5185m 2770 3466 2779 3416 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m<>20 6 8 7 Sodium ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m >20 8 0 <1	Phosphorus	ppm	ASTM D5185m	760	909	928	945
CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>20687SodiumppmASTM D5185m223PotassiumppmASTM D5185m>2080<1	Zinc	ppm	ASTM D5185m	830	1127	1170	1189
Silicon ppm ASTM D5185m >20 6 8 7 Sodium ppm ASTM D5185m 2 2 3 Potassium ppm ASTM D5185m 20 8 0 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Sulfur	ppm	ASTM D5185m	2770	3466	2779	3416
Sodium ppm ASTM D5185m 2 2 3 Potassium ppm ASTM D5185m<>20 8 0 <1	CONTAMINA	NTS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 8 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >3 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Silicon	ppm		>20			
INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >3 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Sodium	ppm	ASTM D5185m		2	2	3
Soot % % *ASTM D7844 >3 0.2 0.3 0.2 Nitration Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Potassium	ppm	ASTM D5185m	>20	8	0	<1
Nitration Abs/cm *ASTM D7624 >20 8.9 9.8 8.2 Sulfation Abs/.1mm *ASTM D7615 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 20.6 22.5 21.3 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Soot %	%	*ASTM D7844	>3	0.2	0.3	0.2
FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Nitration	Abs/cm	*ASTM D7624	>20	8.9	9.8	8.2
Oxidation Abs/.1mm *ASTM D7414 >25 18.6 23.4 19.8	Sulfation	Abs/.1mm	*ASTM D7415	>30	20.6	22.5	21.3
	FLUID DEGRA	ADATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 10.7 7.6 9.9 10.2	Oxidation	Abs/.1mm	*ASTM D7414	>25	18.6	23.4	19.8
	Base Number (BN) mg KOH/g	ASTM D2896	10.7	7.6	9.9	10.2

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.

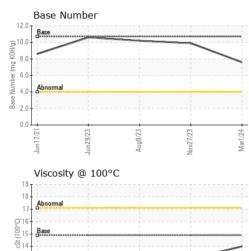


Base

12

Jun17/21

OIL ANALYSIS REPORT



Aug8/23 .

Nov27/23

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
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPE	ERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.9	14.0	13.0	12.9
GRAPHS						
Ferrous Alloys						
)T		\sim				
iron						
chromium		>				
- nickel	/					
IIICKEI						
	/					
2 -						
Report						
	23 -	23 .				
Jun 17/21 Jun 29/23	Aug8/23	Nov27/23 -	Mar1/24			
Jun J	Au	Nov	Z			
Non-ferrous Meta	ls					
⁰ T:		·				
copper						
8 - tenu		\wedge				
6 - 1						
2-						
******		N1222				
7/21	8/23	7/23	1/24			
Jun17/21 Jun29/23	Aug8/23	Nov27/23	Mar1/24			
		Z				
Viscosity @ 100°	-		10.0	Base Number	-	
8-			12.0	Base		
Abnormal			10.0			~
i i			0.8 KOH	-		
5 - Base			<u>32</u> 0.0			
			Вш			
			.0.9 gu			
4			6.0 Numper	Abnormal		
4 3 Abnormal			qui	Abnormal		

0.0

Jun17/21-

un29/23

Mar1/24 -

:07 Mar 2024

:07 Mar 2024



Unique Number : 10914638 Diagnosed : 09 Mar 2024 - Don Baldridge Test Package : FLEET Contact: DYLAN TOLAN Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. dylan.tolan@gflenv.com * - 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)

Aug8/23 -

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

Received

Tested

Nov27/23 -

12 11

Laboratory Sample No.

Lab Number : 06111141

Jun17/21-

: GFL0097489

un29/23

Aug8/23 +

GFL Environmental - 641 - Alpena

1241 KING SETTLEMENT RD

Nov27/23 -

Mar1/24 -

F:

ALPENA, MI

T: (989)854-7203

US 49707