

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend



## Machine Id 913002

Component Diesel Engine Fluid DIESEL ENGINE OIL SAE 40 (--- GAL)

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. ( Customer Sample Comment: COMPLETED BY CHARLIE )

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

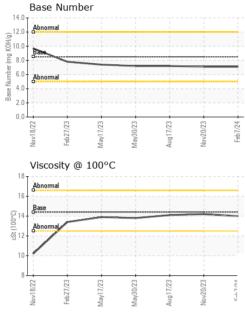
#### **Fluid Condition**

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

		NovZ0ZZ	Feb2023 May2023	May2023 Aug2023 Nov2023	Feb2024	
SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0058112	GFL0058093	GFL0082502
Sample Date		Client Info		07 Feb 2024	20 Nov 2023	17 Aug 2023
Machine Age	hrs	Client Info		3325	2742	2061
Oil Age	hrs	Client Info		583	548	523
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
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	12	18	15
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>4	4	6	2
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>3	0	<1	<1
Aluminum	ppm	ASTM D5185m	>20	2	5	4
Lead	ppm	ASTM D5185m	>40	0	0	<1
Copper	ppm	ASTM D5185m	>330	1	8	12
Tin	ppm	ASTM D5185m	>15	1	1	1
Vanadium	ppm	ASTM D5185m		<1	<1	<1
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 2	history1 13	history2 2
	ppm ppm					
Boron		ASTM D5185m	250	2	13	2
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	2 0	13 0	2 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	2 0 60	13 0 64	2 0 66
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	2 0 60 <1	13 0 64 <1	2 0 66 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	2 0 60 <1 935	13 0 64 <1 980	2 0 66 <1 1021
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	2 0 60 <1 935 1032	13 0 64 <1 980 1101	2 0 66 <1 1021 1214
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	250 10 100 450 3000 1150	2 0 60 <1 935 1032 1000	13 0 64 <1 980 1101 1050	2 0 66 <1 1021 1214 1035
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	250 10 100 450 3000 1150 1350	2 0 60 <1 935 1032 1000 1176 2728	13 0 64 <1 980 1101 1050 1282	2 0 66 <1 1021 1214 1035 1304
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	250 10 100 450 3000 1150 1350 4250	2 0 60 <1 935 1032 1000 1176 2728	13 0 64 <1 980 1101 1050 1282 2840	2 0 66 <1 1021 1214 1035 1304 3358
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	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b>	2 0 60 <1 935 1032 1000 1176 2728 current	13 0 64 <1 980 1101 1050 1282 2840 history1	2 0 66 <1 1021 1214 1035 1304 3358 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	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b>	2 0 60 <1 935 1032 1000 1176 2728 current 4	13 0 64 <1 980 1101 1050 1282 2840 history1 9	2 0 66 <1 1021 1214 1035 1304 3358 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	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >216	2 0 60 <1 935 1032 1000 1176 2728 current 4 4 2	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6
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	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >216 >20	2 0 60 <1 935 1032 1000 1176 2728 current 4 4 2	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6 10	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6 8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >216 >216 >20	2 0 60 <1 935 1032 1000 1176 2728 <u>current</u> 4 4 2 2	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6 10 10 history1	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6 8 8 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 ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >216 >216 >20 <b>limit/base</b>	2 0 60 <1 935 1032 1000 1176 2728 <u>current</u> 4 4 2 <u>current</u> 0.6	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6 10 10 history1 0.7	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6 8 <i>history2</i> 0.6
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	250 10 100 450 3000 1150 1350 4250 20 <b>limit/base</b> >216 >20 <b>limit/base</b>	2 0 60 <1 935 1032 1000 1176 2728 <u>current</u> 4 4 2 2 <u>current</u> 0.6 9.8 21.2	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6 10 history1 0.7 10.0	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6 8 8 history2 0.6 9.5
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	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >216 >20 <b>imit/base</b> >3 >20 >30	2 0 60 <1 935 1032 1000 1176 2728 Current 4 4 2 Current 0.6 9.8 21.2 Current	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6 10 history1 0.7 10.0 22.2 history1	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6 6 8 history2 0.6 9.5 22.1 history2
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 D7844 *ASTM D7844	250 10 100 450 3000 1150 1350 4250 20 216 >216 >20 >20 >30 >30 kimit/base	2 0 60 <1 935 1032 1000 1176 2728 <u>current</u> 4 4 2 2 <u>current</u> 0.6 9.8 21.2	13 0 64 <1 980 1101 1050 1282 2840 history1 9 6 10 history1 0.7 10.0 22.2	2 0 66 <1 1021 1214 1035 1304 3358 history2 6 6 6 8 8 history2 0.6 9.5 22.1



# **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
/20/23	eb7/24	Appearance	scalar	*Visual		NORML		NORML
Nov	Ľ.	Odor						NORML
					>0.2	-		NEG
		Free Water	scalar	*Visual		NEG	NEG	NEG
		FLUID PROPE	RTIES	method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445	14.4	14.0	14.2	14.1
23	V Cr	40 iron						
Vov20)	Enh 7	35 - nickel						
-								
		E 20						
		15-						
		10						
		5						
		8/22 -	30/23 -	7/23 -	7/24 -			
		Nov1 Feb2	May3	Aug1 Nov2	Feb			
			ls					
		160 copper						
		140 - tin						
		120						
		40						
		20						
			)/23	//23	1/24			
		Nov18 Feb27 May17	May30	Aug17 Nov20	Feb7			
			2			Base Number		
		17- Abnormal	1		14.0	Abnormal		
		16						
					Q 10.0	Base		
		€ #13 Abnormal			e c.0 -2 -2 -2			
		12			N 4 0	Abnormal		
		11			2.0			
		10-			2.0			
		94				3 3 3	· · · ·	n m +
			10/23 -	1/23	12/20	2/81		1/2
		Nov18/22 +	May30/23 -	Aug17/23 Nov20/23	Feb7/24	Nov18/22	May30/23	Aug 17/23 Nov20/23 Feb7/24
Laboro	tory	Nov18/22 Feb27/23 May17/23						r z
Labora Sample				on Ave., Cary			onmental - 657 - Ch	∝
Sample Lab Nu	e No. mber	: WearCheck USA - 50 : GFL0058112 : 06083299	1 Madiso Recei Teste	n Ave., Cary ived : 08	, NC 27513 8 Feb 2024 8 Feb 2024	GFL Enviro	onmental - 657 - Ch	arlottesville Hauling Richmond Road Troy, VA
Sample Lab Nu Unique N	e No. mber lumber	: WearCheck USA - 50 : GFL0058112 : 06083299 : 10870744	1 Madiso Recei Teste	n Ave., Cary ived : 08	, NC 27513 3 Feb 2024	GFL Enviro	onmental - 657 - Ch 5498 F	arlottesville Hauling Richmond Road Troy, VA US 22974
Sample Lab Nu Unique N Test Pac	e No. mber lumber ckage	: WearCheck USA - 50 : GFL0058112 : 06083299	1 Madiso Recei Teste Diagr	n Ave., Cary ived : 08 ed : 08 nosed : 09	, NC 27513 8 Feb 2024 8 Feb 2024 Feb 2024 - Don	GFL Enviro	onmental - 657 - Ch 5498 F Contac	arlottesville Hauling Richmond Road Troy, VA
	Nov2073		White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water <b>FLUID PROPE</b> Visc @ 100°C <b>GRAPHS</b> Ferrous Alloys Out and the second seco	White Metal scalar Yellow Metal scalar Precipitate scalar Debris scalar Sand/Dirt scalar Appearance scalar Odor scalar Emulsified Water scalar Free Water scalar Free Water scalar Free Water scalar Free Water scalar Free Water scalar Monorferrous Alloys Mon-ferrous Metals	White Metal scalar 'Visual Yellow Metal scalar 'Visual Precipitate scalar 'Visual Debris scalar 'Visual Debris scalar 'Visual Sand/Dirt scalar 'Visual Appearance scalar 'Visual Odor scalar 'Visual Emulsified Water scalar 'Visual Free Water scalar 'Visual Monor C cSt ASTM D445 CRAPHS Ferrous Alloys Viscosity @ 100°C Viscosity @ 100°C	White Metal scalar *Visual NONE Yellow Metal scalar *Visual NONE Precipitate scalar *Visual NONE Sitt scalar *Visual NONE Sand/Dirt scalar *Visual NONE Appearance scalar *Visual NORML Odor scalar *Visual *0.2 Free Water scalar *Visual *0.2 Free Water scalar *Visual *0.2 Free Water scalar *Visual *0.2 Free Visual *0.0 Non-ferrous Metals *Viscosity @ 100°C	White Metal scalar *Visual NONE NONE Yellow Metal scalar *Visual NONE NONE Precipitate scalar *Visual NONE NONE Sitt scalar *Visual NONE NONE Sand/Dirt scalar *Visual NONE NONE Appearance scalar *Visual NONE NORML Odor scalar *Visual NORML NORML Odor scalar *Visual NORML NORML NORML Odor scalar *Visual NORML	White Metal scalar 'Visual NONE NONE NONE NONE Precipitate scalar 'Visual NONE NONE NONE NONE Debris scalar 'Visual NONE NONE NONE NONE Sand/Dirt scalar 'Visual NONE NONE NONE NONE Sand/Dirt scalar 'Visual NONE NONE NONE Appearance scalar 'Visual NORML NORML NORML NORML Odor scalar 'Visual NORML NORML NORML NORML Emulsified Water scalar 'Visual NORML NORML NORML Visc @ 100°C cst ASTM D445 14.4 14.0 14.2 CRAPHS Ferrous Alloys Uscosity @ 100°C Viscosity @ 100°C Viscosity @ 100°C Mon-ferrous Metals Viscosity @ 100°C Mon-ferrous Metals Viscosity @ 100°C

Submitted By: Jonathan Wills