

## **OIL ANALYSIS REPORT**

Sample Rating Trend





#### Component Diesel Engine Fluid DIESEL ENGINE OIL SAE 40 (38 QTS)

### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor. Please specify the brand, type, and viscosity of the oil on your next sample.

#### Wear

All component wear rates are normal.

#### Contamination

Elevated aluminum (AI) and/or lead (Pb) and potassium (K) levels in your metals analysis are likely a result of solder flux release into the lubricant and is common on new equipment/components. There is no indication of any contamination in the oil.

#### Fluid Condition

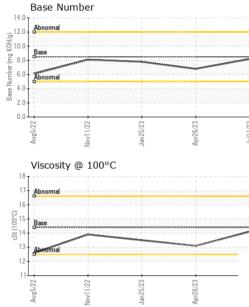
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

		Aug2022	Nov2022	Jan 2023 Apr 2023	Jul2023	
SAMPLE INFOR	RMATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0071555	GFL0071533	GFL0061693
Sample Date		Client Info		11 Jul 2023	26 Apr 2023	25 Jan 2023
Machine Age	hrs	Client Info		0	0	0
Oil Age	hrs	Client Info		600	600	600
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINA	ΓΙΟΝ	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAI	_S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>90	18	26	23
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>2	0	0	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m		18	15	21
Lead	ppm	ASTM D5185m	>40	0	0	0
Copper	ppm	ASTM D5185m		2	6	1
Tin	ppm	ASTM D5185m	>15	_ <1	0	<1
Vanadium	ppm	ASTM D5185m	>15	0	0	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
Boron		ASTM D5185m	250	3	9	8
	ppm		200			
	ppm ppm			-	0	0
Barium	ppm	ASTM D5185m	10	<1	0	0
Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m		<1 70	0 64	0 64
Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	10 100	<1 70 <1	0 64 2	0 64 <1
Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450	<1 70 <1 1101	0 64 2 1020	0 64 <1 920
Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000	<1 70 <1 1101 1268	0 64 2 1020 1272	0 64 <1 920 1120
Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150	<1 70 <1 1101 1268 1205	0 64 2 1020 1272 1038	0 64 <1 920 1120 986
Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000	<1 70 <1 1101 1268	0 64 2 1020 1272	0 64 <1 920 1120
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250	<1 70 <1 1101 1268 1205 1476	0 64 2 1020 1272 1038 1359 3369	0 64 <1 920 1120 986 1259
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350	<1 70 <1 1101 1268 1205 1476 4042	0 64 2 1020 1272 1038 1359	0 64 <1 920 1120 986 1259 3532
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	10 100 450 3000 1150 1350 4250 limit/base	<1 70 <1 1101 1268 1205 1476 4042 current	0 64 2 1020 1272 1038 1359 3369 history1	0 64 <1 920 1120 986 1259 3532 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25	<1 70 <1 1101 1268 1205 1476 4042 <u>current</u> 4	0 64 2 1020 1272 1038 1359 3369 history1 7	0 64 <1 920 1120 986 1259 3532 history2 4
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm <b>VTS</b>	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <i>limit/base</i> >25 >216	<1 70 <1 1101 1268 1205 1476 4042 current 4 5	0 64 2 1020 1272 1038 1359 3369 history1 7 7	0 64 <1 920 1120 986 1259 3532 history2 4 4
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm <b>VTS</b>	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >216 >20	<1 70 <1 1101 1268 1205 1476 4042 current 4 5 30	0 64 2 1020 1272 1038 1359 3369 history1 7 7 7 29	0 64 <1 920 1120 986 1259 3532 history2 4 4 32
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <i>limit/base</i> >25 >216 >20 <i>limit/base</i>	<1 70 <1 1101 1268 1205 1476 4042 <i>current</i> 4 5 30 <i>current</i> 0.5	0 64 2 1020 1272 1038 1359 3369 history1 7 7 29 history1	0 64 <1 920 1120 986 1259 3532 history2 4 4 32 history2
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm vtts	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >216 >20 <b>limit/base</b> >6 >20	<1 70 <1 1101 1268 1205 1476 4042 <i>current</i> 4 5 30 <i>current</i>	0 64 2 1020 1272 1038 1359 3369 history1 7 7 7 29 history1 0.5	0 64 <1 920 1120 986 1259 3532 history2 4 4 32 history2 0.5
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	<pre>ppm ppm ppm ppm ppm ppm ppm ppm ppm vTTS ppm ppm ppm ppm ppm ppm ppm ppm ppm pp</pre>	ASTM D5185m ASTM D7844 *ASTM D7824	10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >216 >20 <b>limit/base</b> >6 >20	<1 70 <1 1101 1268 1205 1476 4042 <u>current</u> 4 5 30 <u>current</u> 0.5 9.7	0 64 2 1020 1272 1038 1359 3369 history1 7 7 29 history1 0.5 10.0	0 64 <1 920 1120 986 1259 3532 history2 4 4 32 history2 0.5 9.1
Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	<pre>ppm ppm ppm ppm ppm ppm ppm ppm ppm vTTS ppm ppm ppm ppm ppm ppm ppm ppm ppm pp</pre>	ASTM D5185m ASTM D7844 *ASTM D7824	10 100 450 3000 1150 1350 4250 <i>limit/base</i> >25 >216 >20 <i>limit/base</i> >6 >20	<1 70 <1 1101 1268 1205 1476 4042 <i>current</i> 4 5 30 <i>current</i> 0.5 9.7 20.3	0 64 2 1020 1272 1038 1359 3369 history1 7 7 29 history1 0.5 10.0 21.1	0 64 <1 920 1120 986 1259 3532 history2 4 4 4 32 history2 0.5 9.1 19.4



# **OIL ANALYSIS REPORT**

VISUAL



		VISUAL		method	IIIIII/Dase	current	Thistory I	nistory2
1		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
Jan 25/23	Apr26/23 Jul11/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Jan 2	Apr2 Jul1	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
		Free Water	scalar	*Visual		NEG	NEG	NEG
		FLUID PROPI	ERTIES	method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445	14.4	14.1	13.1	13.5
		GRAPHS						
		Ferrous Alloys						
13		70 iron						
Jan 25/23	Apr26/23	60 - chromium						
ň	4	50						
		E 30						
			~					
		20 -			_			
		10						
		0 0	~	en en	~			
		Aug5/22 Vov11/22	Jan 25/23	Apr26/23	Jul11/23			
		2	-	AF	٦٢			
		Non-ferrous Meta	als					
		copper						
		ssassassass tin						
		10						
		6		~				
		4						
		2	$\checkmark$	 				
			~					
		Aug5/22 Nov11/22	Jan 25/23	Apr26/23	Jul11/23			
		2		Ap	٦٢			
		Viscosity @ 100°	С			Base Number		
		17			14			
		17 Abnormal	1		12	0 - Abnormal	1	1
		16-			Base Number (mg KOH(g)			
		(2-15 Base 3 14			ß	0 - Base		
		ti 14			6 mp	0 Abnormal		
		13 Abnormal			<u> </u>			
		13 Abriormal 12			2	.0 +		
		d						
		12	5/23	6/23	0	.0	5/23	6/23
		12 -	Jan25/23	Apr26/23			Jan25/23 +	Apr26/23
		12	Jan25/23	Apr26/23	0	.0	Jan25/23	Apr26/23
d	Laboratory	12 11 12 12 12 12 12 12 12 12	501 Madi	son Ave., Ca	ور الالم ry, NC 2751	Aug5/22	ironmental - 0	35 - Greensbo
NAB	Laboratory Sample No.	2259 2211000 : WearCheck USA - : GFL0071555	501 Madi Received	son Ave., Ca d : 24 c	ry, NC 2751 Jul 2023	Aug5/22	ironmental - 0	<b>35 - Greensbo</b> 1236 Elon Plac
	Laboratory Sample No. Lab Number	2259 2211000 : WearCheck USA - : GFL0071555 : 05905267	501 Madi Received Diagnos	son Ave., Ca d : 24 c ed : 24 c	ry, NC 2751 Jul 2023 Jul 2023	Aug5/22	ironmental - 0	<b>35 - Greensbo</b> 1236 Elon Plac High Point, N
	Laboratory Sample No. Lab Number Unique Number	225 12 12 12 12 12 12 12 12 12 12	501 Madi Received	son Ave., Ca d : 24 c ed : 24 c	ry, NC 2751 Jul 2023	Aug5/22	ironmental - 0	<b>35 - Greensbo</b> 1236 Elon Plac High Point, N US 2726
tificate 12367	Laboratory Sample No. Lab Number Unique Number Test Package	225 12 12 12 12 12 12 12 12 12 12	501 Madia Received Diagnos Diagnos	son Ave., Ca d : 24 d ed : 24 d tician : Wes	ry, NC 2751 Jul 2023 Jul 2023 s Davis	Aug5/22	ironmental - 0	<b>35 - Greensbo</b> 1236 Elon Plac High Point, N

Submitted By: JORGE COSTA

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