

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Machine Id 912083

Fluid

Component Diesel Engine

MOBIL DELVAC 1300 SUPER15W40 (10 GAL)

Sample Number Client Info GFL0073224 GFL0088474 GFL00732 Sample Date Client Info 16 Nov 2023 30 Aug 2023 13 Jun 202 Machine Age hrs Client Info 4842 4293 3704 Oil Age hrs Client Info 650 650 650 650 Oil Age hrs Client Info Changed NORMAL NORMA NORMAL NORMAL	SUPER15W40 (10) GAL)	Jun2022 A	lug2022 Nov2022 Jan20	23 Mar2023 Jun2023 Aug2023	Nov2023	
Sample Date Client Info 16 Nov 2023 30 Aug 2023 13 Jun 202 Machine Age hrs Client Info 4842 4293 3704 Oil Age hrs Client Info 650 650 650 Oil Changed Client Info Changed NORMAL	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Date Client Info 16 Nov 2023 30 Aug 2023 13 Jun 202 Machine Age hrs Client Info 4842 4293 3704 Oil Age hrs Client Info 650 650 650 Oil Changed Client Info Changed NORMAL	Sample Number		Client Info		GFL0073224		GFL0073218
Machine Age hrs Client Info 4842 4293 3704 Oil Age hrs Client Info 650 650 650 Oil Changed Client Info Changed NORMAL NORMAL NORMAL Changed Normal File VC Method S.0 <1.0 <1.0 <1.0 Client Info Sile Client Info Sile Client Info Sile Sile Normal Sile Client Info Sile							13 Jun 2023
Oil Age hrs Client Info 650 650 650 650 Oil Changed Client Info Changed Changed Changed Changed Sample Status Imit/base current NoRMAL NORMAL CONTAMINATION method imit/base current Nistory Fuel WC Method >.0.2 NEG NEG NEG Water WC Method >.0.2 NEG NEG NEG Glycol WC Method >.0.2 1.4 1.4 1.2 Vickel ppm ASTM D5185m >12.0 <1 1.4 1.2 Tranium ppm ASTM D5185m >2.0 0 .1 .1 Silver ppm ASTM D5185m >2.0 0 0 0 Cadmium ppm ASTM D5185m >2.0 0 0 0 .1 1 1 1 1 1 1 1 1 1 1 1	•	hrs				0	
Oil Changed Sample Status Client Info Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method >3.0 <1.0	•				-		
Sample Status Image NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history1 Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5165m >20 0 <1 <1 Chromium ppm ASTM D5165m >20 0 <1 <1 Silver ppm ASTM D5165m >20 2 3 1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 1 <1 <1	•						
Fuel WC Method >3.0 <1.0	U				•	0	0
Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method Imit/base current history1 history1 Iron ppm ASTM D5185m >120 <1 14 12 Chromium ppm ASTM D5185m >20 0 <1 <1 Nickel ppm ASTM D5185m >20 0 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 0 0 0 Copper ppm ASTM D5185m >20 2 3 1 Lead ppm ASTM D5185m >30 <1 4 3 Tin ppm ASTM D5185m >15 <1 <1 1 Vanadium ppm ASTM D5185m 0 0 0 0 ADDITIVES method Imit/base current history1 <td< th=""><th>CONTAMINAT</th><th>ION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	CONTAMINAT	ION	method	limit/base	current	history1	history2
Głycoł WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >20 0 <1 <1 Nickel ppm ASTM D5185m >20 0 <1 <1 Nickel ppm ASTM D5185m >2 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 2 3 1 Lead ppm ASTM D5185m >20 2 3 1 Lead ppm ASTM D5185m >20 2 3 1 Cadmium ppm ASTM D5185m >20 2 3 1 Cadmium ppm ASTM D5185m >15 <1 <1 1 Vanadium ppm ASTM D5185m 0 0 0 0 <th>Fuel</th> <th></th> <th>WC Method</th> <th>>3.0</th> <th><1.0</th> <th><1.0</th> <th><1.0</th>	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >120 <1 14 12 Chromium ppm ASTM D5185m >20 0 <1 <1 Nickel ppm ASTM D5185m >20 0 <1 <1 Titanium ppm ASTM D5185m >2 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >20 2 3 1 Lead ppm ASTM D5185m >40 <1 0 0 Copper ppm ASTM D5185m 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0 471 247 28 Barium ppm ASTM D5185m 0 79 88 42 Maganese ppm ASTM D5185m 0 383 453 <th>Water</th> <th></th> <th>WC Method</th> <th>>0.2</th> <th>NEG</th> <th>NEG</th> <th>NEG</th>	Water		WC Method	>0.2	NEG	NEG	NEG
Iron ppm ASTM D5185m >120 <1	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 0 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium ppm ASTM D5185m >20 0 <1	Iron	ppm	ASTM D5185m	>120	<1	14	12
Nickel ppm ASTM D5185m >5 0 <1	Chromium		ASTM D5185m	>20	0	<1	<1
Titanium ppm ASTM D5185m >2 <1	Nickel		ASTM D5185m	>5	0	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 2 3 1 Lead ppm ASTM D5185m >40 <1 0 0 Copper ppm ASTM D5185m >330 <1 4 3 Tin ppm ASTM D5185m >15 <1 <1 1 Vanadium ppm ASTM D5185m >15 <1 <1 1 Cadmium ppm ASTM D5185m <1mit/base current history1 history1 Barium ppm ASTM D5185m 0 471 247 28 Barium ppm ASTM D5185m 0 799 88 42 Magnese ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 0 383 3568 2700 Phosphorus ppm ASTM D5185m 225	Titanium		ASTM D5185m	>2	<1	<1	<1
Lead ppm ASTM D5185m >40 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 <1	Aluminum	ppm	ASTM D5185m	>20	2	3	1
Tin ppm ASTM D5185m >15 <1	Lead	ppm	ASTM D5185m	>40	<1	0	0
Vanadium ppm ASTM D5185m <1	Copper	ppm	ASTM D5185m	>330	<1	4	3
Cadmium ppm ASTM D5185m 0 <<1	Tin	ppm	ASTM D5185m	>15	<1	<1	1
ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 471 247 28 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 79 88 42 Manganese ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 1381 1627 1909 Phosphorus ppm ASTM D5185m 1300 1333 943 Sulfur ppm ASTM D5185m 1300 1333 943 Sulfur ppm ASTM D5185m 25 5 9 5 Sodium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method imit/base current history1 history1	Vanadium	ppm	ASTM D5185m		<1	<1	<1
Boron ppm ASTM D5185m 0 471 247 28 Barium ppm ASTM D5185m 0 0 0 0 0 Molybdenum ppm ASTM D5185m 0 79 88 42 Manganese ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 1380 1333 943 Sulfur ppm ASTM D5185m 255 5 9 5 Sodium ppm ASTM D5185m >20 1 0 <th>Cadmium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th>0</th> <th><1</th>	Cadmium	ppm	ASTM D5185m		0	0	<1
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 79 88 42 Manganese ppm ASTM D5185m 0 79 88 42 Magnesium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 1381 1627 1909 Phosphorus ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 79 88 42 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 1381 1627 1909 Phosphorus ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 13300 1333 943 Sulfur ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >20 1 0 <1 Sodium ppm ASTM D5185m >20 1 0.7 0.7 Ntration Abs/cm *ASTM D7844 >4 0.1 0.7 0.7 <	Boron	ppm	ASTM D5185m	0	471	247	28
Marganese ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 0 383 453 531 Calcium ppm ASTM D5185m 1381 1627 1909 Phosphorus ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 1300 1333 943 Sulfur ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >20 1 0 <1	Molybdenum	ppm	ASTM D5185m	0	79	88	42
Calcium ppm ASTM D5185m 1381 1627 1909 Phosphorus ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 1300 1333 943 Sulfur ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.1 0.7 0.7 Nitration Abs/cm< *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 1082 1050 736 Zinc ppm ASTM D5185m 1300 1333 943 Sulfur ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 <	Magnesium	ppm	ASTM D5185m	0	383	453	531
Zinc ppm ASTM D5185m 1300 1333 943 Sulfur ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >20 1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 13.9 </th <th>Calcium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th></th> <th>1627</th> <th>1909</th>	Calcium	ppm	ASTM D5185m			1627	1909
Sulfur ppm ASTM D5185m 3393 3568 2700 CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >20 1 3 2 Potassium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0							
CONTAMINANTS method limit/base current history1 history Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m <1 3 2 Potassium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0		ppm					
Silicon ppm ASTM D5185m >25 5 9 5 Sodium ppm ASTM D5185m <1 3 2 Potassium ppm ASTM D5185m >20 1 0 <1 INFRA-RED method limit/base current history1 history Soot % % *ASTM D7844 >4 0.1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0			ASTM D5185m		3393	3568	
Sodium ppm ASTM D5185m <1		TS					history2
Potassium ppm ASTM D5185m >20 1 0 <1				>25			
INFRA-REDmethodlimit/basecurrenthistory1history1Soot %%*ASTM D7844>40.10.70.7NitrationAbs/cm*ASTM D7624>204.88.09.1SulfationAbs/.1mm*ASTM D7415>3020.322.823.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1OxidationAbs/.1mm*ASTM D7414>2513.916.822.0		ppm					
Soot % % *ASTM D7844 >4 0.1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0	Potassium	ppm	ASTM D5185m	>20	1	0	<1
Nitration Abs/cm *ASTM D7624 >20 4.8 8.0 9.1 Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0	INFRA-RED		method	limit/base	current	, , , , , , , , , , , , , , , , , , ,	history2
Sulfation Abs/.1mm *ASTM D7415 >30 20.3 22.8 23.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0							
FLUID DEGRADATION method limit/base current history1 history Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0				>20			
Oxidation Abs/.1mm *ASTM D7414 >25 13.9 16.8 22.0	Sulfation	Abs/.1mm	*ASTM D7415	>30	20.3	22.8	23.8
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.4 8.1 6.3 9.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.9	16.8	22.0
	Base Number (BN)	mg KOH/g	ASTM D2896	9.4	8.1	6.3	9.0

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 acceptable for the time in service.



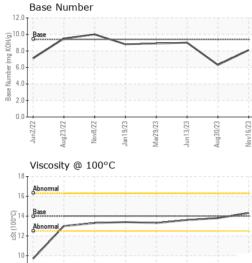
Jun2/22

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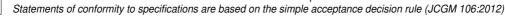
Aug23/22

Nov8/22

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		
	\sim	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 1 9/23 Mar2 9/23	Jun 13/23 - Aug 30/23 - Nov 16/23 -	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML		
Mar	Aug	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	14.3	13.8	13.6		
		GRAPHS								
		Ferrous Alloys								
Jan 1 9/23 - Mar 2 9/23 -	Jun13/23 - Aug30/23 -	50								
Jan1 Marź	Juni Augi	40								
		<u>ة</u> 30								
		20								
		10								
		5 55 55 <u>5</u>	/23	/23	3					
		Jun2/22 Aug23/22 Nov8/22	Jan 19/23 Mar29/23	Jun13/23 Aug30/23	Nov16/23					
		Non-ferrous Meta	als							
		140 copper								
		120 - Ilead								
		100								
		80								
		60 I								
		40								
		20								
			123	123	/23					
		Jun2/22 Aug23/22 Nov8/22	Jan 19/23 Mar29/23	Jun13/23 Aug30/23	Nov16/23					
		Viscosity @ 100°	С	Base Number	se Number					
		17- Abnormal			12.0					
		16			10.0 F	Base		_		
	-	Deve			0.8 K0H/d) Base Nnmper Base J. 4	/		\backslash		
		3 14 - Dase 0 13 - Abnormal 3 12 -			<u>ل</u> 1.9 م	•		\sim		
		3 12			4.0	J				
		10			2.0					
		9-								
		22	/23-	/23 -	0.0	22	123	/23+		
		Jun 2/22 Aug 23/22 Nov 8/22	Jan 19/23 Mar29/23	Jun13/23 Aug30/23	Nov16/23	Jun2/22 Aug23/22 Nov8/22	Jan 1 9/23 Mar2 9/23	Jun13/23 Aug30/23		
	Laboratory		WearCheck USA - 501 Madison Ave., Cary, NC 27513				vironmental -			
	Sample No.	: GFL0073224	GFL0073224 Received : 20 Nov 2023					GFL Environmental - 146 - August 1064 Franke Industria		
C C R E D I T E D	Lab Number	: 06011955	•	agnosed : 21 Nov 2023			Augusta, G			
TESTING LABORATORY	Unique Number	: 10751099	Diagnos	Diagnostician : Sean Felton			US 3090 Contact: JEFFERY WASHINGTO			
						Cont	AAT ILLEDV	MARCHINGTON		
Certificate L2367	Test Package	: FLEET contact Customer Ser	vice at 1 0	200-227-1260	2	Cont		on@gflenv.cor		



Submitted By: CHRISTOPHER FARRER