

OIL ANALYSIS REPORT

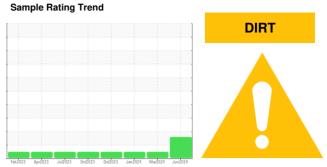




Machine Id 420093 - SW4021

Diesel Engine

PETRO CANADA DURON SHP 15W40 (--- GAL)



DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Elemental level of silicon (Si) above normal.

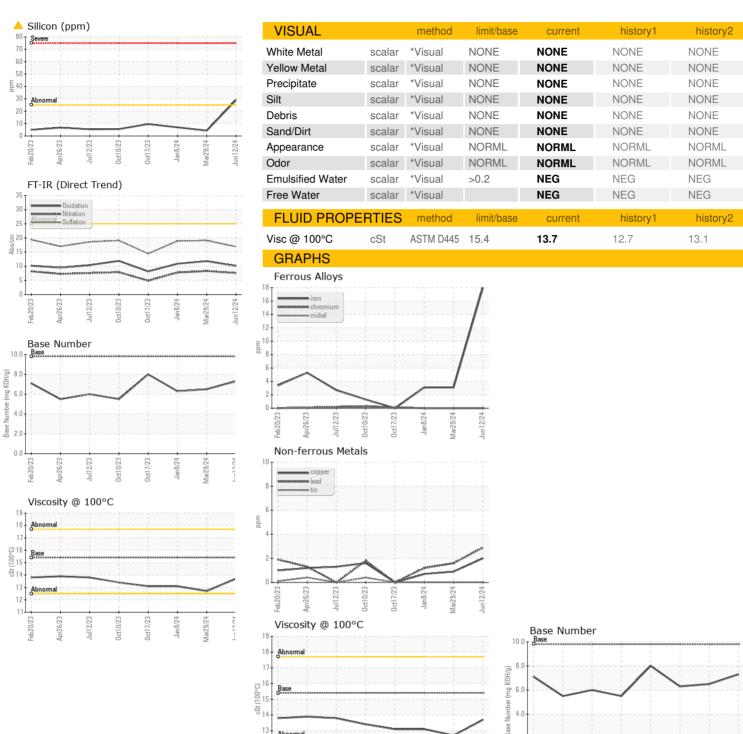
Fluid Condition

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 GFL0123544 (2) and 2024 GFL0112041 GFL010549 Sample Date Client Info 12 Jun 2024 29 Mar 2024 08 Jan 2024	N SHP 15W40 (- GAL)	Feb2023	Aprž023 Julž023 Oct20.	23 Oct2023 Jan 2024 Mar 2024	Jun2024	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age mis Client Info 148809 140322 130745 13	Sample Number		Client Info		GFL0123544	GFL0112041	GFL0105497
Oil Age mls Client Info 148809 140322 130745 Oil Changed Sample Status Client Info Changed Changed Changed Changed Changed NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Sample Date		Client Info		12 Jun 2024	29 Mar 2024	08 Jan 2024
Oil Changed Sample Status Client Info Changed ABNORMAL NORMAL NORMAL NORMAL Changed NORMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Machine Age	mls	Client Info		148809	140322	130745
ABNORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 history2 water WC Method >3.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1.0 <1	Oil Age	mls	Client Info		148809	140322	130745
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		Changed	Changed	Changed
Fuel	Sample Status				ABNORMAL	NORMAL	NORMAL
Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 18 3 3 Chromium ppm ASTM D5185m >20 0 0 0 Nickel ppm ASTM D5185m >20 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 <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 history2 Iron ppm ASTM D5185m >120 18 3 3 Chromium ppm ASTM D5185m >20 0 0 0 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 1 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 0 0 0 Nickel ppm ASTM D5185m >5 0 0 0 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >20 1 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >5 0 0 0 0 0 Titanium ppm ASTM D5185m >2 0 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 0 Aluminum ppm ASTM D5185m >2 0 1 < 1 < 1 Lead ppm ASTM D5185m >2 0 1 < 1 < 1 Copper ppm ASTM D5185m >330 2 < 1 < 1 Tin ppm ASTM D5185m >15 0 0 0 0 Vanadium ppm ASTM D5185m 0 0 < 1 < 1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 10 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 10 0 0 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Solicium ppm ASTM D5185m 10 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Iron	ppm	ASTM D5185m	>120	18	3	3
Nickel ppm ASTM D5185m >5 0 0 0 Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 <1	Chromium		ASTM D5185m	>20	0	0	0
Titanium ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 <1	Nickel		ASTM D5185m	>5	0	0	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 <1 <1 Lead ppm ASTM D5185m >40 3 2 1 Copper ppm ASTM D5185m >330 2 <1 <1 Tin ppm ASTM D5185m 0 0 <1 <1 Vanadium ppm ASTM D5185m 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0 0 <1 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 Barium ppm ASTM D5185m 0 0<	Titanium		ASTM D5185m	>2	0	0	0
Aluminum ppm ASTM D5185m >20 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 <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 <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 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <td>Silver</td> <td></td> <td>ASTM D5185m</td> <td>>2</td> <td>0</td> <td>0</td> <td>0</td>	Silver		ASTM D5185m	>2	0	0	0
Lead ppm ASTM D5185m >40 3 2 1 Copper ppm ASTM D5185m >330 2 <1 <1 Tin ppm ASTM D5185m >15 0 0 0 Vanadium ppm ASTM D5185m 0 0 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Magnesium ppm ASTM D5185m 1010 10 8 0 <td>Aluminum</td> <td></td> <td>ASTM D5185m</td> <td>>20</td> <td>1</td> <td><1</td> <td><1</td>	Aluminum		ASTM D5185m	>20	1	<1	<1
Copper ppm ASTM D5185m >330 2 <1 <1 Tin ppm ASTM D5185m >15 0 0 0 Vanadium ppm ASTM D5185m 0 0 <1	Lead		ASTM D5185m	>40	3	2	1
Tin ppm ASTM D5185m >15 0 0 0 Vanadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 0 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 10 8 0 Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3963 3969 <td>Copper</td> <td></td> <td>ASTM D5185m</td> <td>>330</td> <td>2</td> <td><1</td> <td><1</td>	Copper		ASTM D5185m	>330	2	<1	<1
Vanadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 50 58 51 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 10 8 0 Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 <					0	0	0
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 <1	Vanadium		ASTM D5185m		0	<1	<1
Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 50 58 51 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 10 8 0 Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1070 2162 2740 2615 Phosphorus ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 29 4 7 Sodium ppm ASTM D5185m	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 50 58 51 Manganese ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 50 58 51 Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 10 8 0 Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1150 1147 1156 1138 Zinc ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 29 4 7 Sodium ppm ASTM D5185m 20 <1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 >4 <	Boron	ppm	ASTM D5185m	0	0	0	0
Manganese ppm ASTM D5185m 0 <1 0 <1 Magnesium ppm ASTM D5185m 1010 10 8 0 Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1150 1147 1156 1138 Zinc ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 29 4 7 Sodium ppm ASTM D5185m 20 <1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7815	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 10 8 0 Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1150 1147 1156 1138 Zinc ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 29 4 7 Sodium ppm ASTM D5185m 20 <1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION *ASTM D7414 <	Molybdenum	ppm	ASTM D5185m	60	50	58	51
Calcium ppm ASTM D5185m 1070 2762 2740 2615 Phosphorus ppm ASTM D5185m 1150 1147 1156 1138 Zinc ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 29 4 7 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1	Manganese	ppm	ASTM D5185m	0	<1	0	<1
Phosphorus ppm ASTM D5185m 1150 1147 1156 1138 Zinc ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 29 4 7 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1	Magnesium	ppm	ASTM D5185m	1010	10	8	0
Zinc ppm ASTM D5185m 1270 1400 1427 1303 Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 ▲ 29 4 7 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1	Calcium	ppm	ASTM D5185m	1070	2762	2740	2615
Sulfur ppm ASTM D5185m 2060 3963 3969 3256 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 ▲ 29 4 7 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1	Phosphorus	ppm	ASTM D5185m	1150	1147	1156	1138
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 ▲ 29 4 7 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1	Zinc	ppm	ASTM D5185m	1270	1400	1427	1303
Silicon ppm ASTM D5185m >25 ▲ 29 4 7 Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.6 8.3 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Sulfur	ppm	ASTM D5185m	2060	3963	3969	3256
Sodium ppm ASTM D5185m 2 2 1 Potassium ppm ASTM D5185m >20 <1	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 <1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.6 8.3 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Silicon	ppm	ASTM D5185m	>25	<u>^</u> 29	4	7
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.6 8.3 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Sodium	ppm	ASTM D5185m		2	2	1
Soot % % *ASTM D7844 >4 0.2 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.6 8.3 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Potassium	ppm	ASTM D5185m	>20	<1	<1	2
Nitration Abs/cm *ASTM D7624 >20 7.6 8.3 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 >20 7.6 8.3 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Soot %	%	*ASTM D7844	>4	0.2	0.2	0.2
Sulfation Abs/.1mm *ASTM D7415 >30 16.9 19.1 18.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Nitration	Abs/cm	*ASTM D7624	>20		8.3	
Oxidation Abs/.1mm *ASTM D7414 >25 10.1 11.8 10.9	Sulfation						
	FLUID DEGRA	OATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	10.1	11.8	10.9
	Base Number (BN)	mg KOH/g			7.3	6.5	



OIL ANALYSIS REPORT







Certificate 12367

Laboratory Sample No.

Test Package : FLEET

: GFL0123544 **Lab Number** : 06213215 Unique Number : 11086079

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: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 18 Jun 2024

Tested : 19 Jun 2024 Diagnosed

: 20 Jun 2024 - Don Baldridge

0.0

16011 West Belfort Street Sugar Land, TX US 77498

Contact: Adrian Martinez adrianmartinez@gflenv.com

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)

Report Id: GFL983 [WUSCAR] 06213215 (Generated: 06/21/2024 19:01:04) Rev: 1

Submitted By: TECHNICIAN ACCOUNT

GFL Environmental - 983 - Sugar Land Hauling

T:

F: