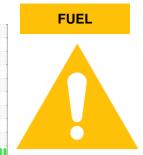


PROBLEM SUMMARY

Sample Rating Trend

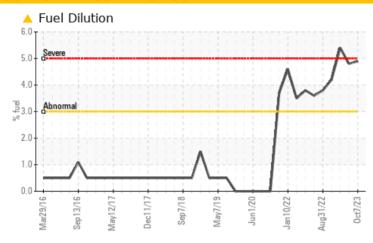


Machine Id **2442**

Component **Diesel Engine**

PETRO CANADA DURON SHP 15W40 (48 QTS)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS								
Sample Status				ABNORMAL	ABNORMAL	ABNORMAL		
Fuel	%	ASTM D3524	>3.0	4.9	<u>4.8</u>	△ 5.4		

Customer Id: GFL001 Sample No.: GFL0094697 Lab Number: 05973851 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Wes Davis +1 905-569-8600 x223 wesd@wearcheck.ca

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Resample			?	We recommend an early resample to monitor this condition.

HISTORICAL DIAGNOSIS

06 Jul 2023 Diag: Wes Davis





The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition. All component wear rates are normal. There is a moderate amount of fuel present in the oil. Tests confirm the presence of fuel in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The oil is no longer serviceable due to the presence of contaminants.



27 Mar 2023 Diag: Doug Bogart

DEGRADATION



We advise that you check the fuel injection system. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.All component wear rates are normal. There is a moderate amount of fuel present in the oil. There is an abnormal amount of solids and carbon present in the oil. The oil is no longer serviceable due to the presence of contaminants.



13 Dec 2022 Diag: Wes Davis

SOOT



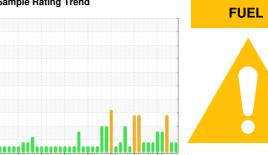
The oil change at the time of sampling has been noted. All component wear rates are normal. Light fuel dilution occurring. Light concentration of carbon/soot present in the oil. No other contaminants were detected in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The oil is no longer serviceable due to the presence of contaminants.





OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id 2442 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (48 QTS)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

All component wear rates are normal.

Contamination

There is a moderate amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

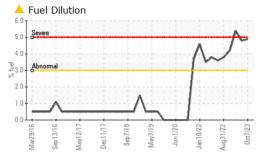
Fluid Condition

The BN result indicates that there is suitable alkalinity remaining in the oil. The oil is no longer serviceable due to the presence of contaminants.

Sample Date	QTS)							
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2	
Machine Age hrs Client Info 42912 42382 41819 Oil Age hrs Client Info 0 0 738 Oil Changed Changed Changed Changed Changed Asmple Status MEG NEG NEG CONTAMINATION method limit/base current history1 history2 Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 35 34 65 Chromium ppm ASTM D5185m >20 <1	Sample Number		Client Info		GFL0094697	GFL0087102	GFL0056619	
Oil Changed Sample Status hrs Client Info Changed Changed Changed Changed Changed ABNORMAL Changed ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL Changed Changed ABNORMAL ABNO	Sample Date		Client Info		07 Oct 2023	06 Jul 2023	27 Mar 2023	
Oil Changed Sample Status Client Info Changed ABNORMAL ABNORMA	Machine Age	hrs	Client Info		42912	42382	41819	
ABNORMAL ABNORMAL ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		0	0	738	
CONTAMINATION	Oil Changed		Client Info		Changed	Changed	Changed	
WEAR METALS	Sample Status				ABNORMAL	ABNORMAL	ABNORMAL	
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 35 34 65 Chromium ppm ASTM D5185m >20 <1 <1 1 Nickel ppm ASTM D5185m >2 0 <1 <1 Titanium ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 0 2 3 Lead ppm ASTM D5185m >40 1 2 3 Copper ppm ASTM D5185m >15 <1 <1 3 3 Tin ppm ASTM D5185m 0 <1 <1 <1 0 <1 0 <1 0 <1 0 <1 0 <1 0 <1 <1 <1 <1 <1 </th <th>CONTAMINAT</th> <th>ION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	CONTAMINAT	ION	method	limit/base	current	history1	history2	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium ppm ASTM D5185m >20 <1 <1 1 Nickel ppm ASTM D5185m >5 <1 <1 <1 Tittanium ppm ASTM D5185m >2 0 <1 0 Siliver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 2 3 Lead ppm ASTM D5185m >40 1 2 3 Copper ppm ASTM D5185m >40 1 2 3 Copper ppm ASTM D5185m >41 1 2 3 Copper ppm ASTM D5185m 0 <1 1 3 5 Caddium ppm ASTM D5185m 0 <1 3 5 Boron ppm ASTM D5185m 0 <1 0 <1 Boron ppm ASTM D5185m 0 <1 0 <td>WEAR METAL</td> <td>S</td> <td>method</td> <td>limit/base</td> <td>current</td> <td>history1</td> <td>history2</td>	WEAR METAL	S	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>120	35	34	65	
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	<1	1	
Silver	Nickel	ppm	ASTM D5185m	>5	<1	<1	<1	
Aluminum ppm ASTM D5185m >20 0 2 3 Lead ppm ASTM D5185m >40 1 2 3 Copper ppm ASTM D5185m >330 3 8 53 Tin ppm ASTM D5185m >15 <1 <1 3 Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 3 5 Boron ppm ASTM D5185m 0 <1 3 5 Barium ppm ASTM D5185m 0 <1 0 <1 Molybdenum ppm ASTM D5185m 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 </td <td>Titanium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>2</td> <td>0</td> <td><1</td> <td>0</td>	Titanium	ppm	ASTM D5185m	>2	0	<1	0	
Lead ppm ASTM D5185m >40 1 2 3 Copper ppm ASTM D5185m >330 3 8 53 Tin ppm ASTM D5185m >15 <1 <1 3 Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 5 Barium ppm ASTM D5185m 0 <1 0 <1 Molybdenum ppm ASTM D5185m 0 <1 0 <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	Silver	ppm	ASTM D5185m	>2	0	0	0	
Copper ppm ASTM D5185m >330 3 8 53 Tin ppm ASTM D5185m >15 <1	Aluminum	ppm	ASTM D5185m	>20	0	2	3	
Tin ppm ASTM D5185m > 15 <1 <1 3 Vanadium ppm ASTM D5185m 0 <1 0 Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 0 <1 0 Molybdenum ppm ASTM D5185m 60 53 56 54 Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 10 0 <1 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 10 0 <1 1 <1 <1 <1 Magnesium ppm ASTM D5185m 10 0 0 <1 <1 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 10 0 0 <1 1 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Lead	ppm	ASTM D5185m	>40	1	2	3	
Vanadium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 5 Barium ppm ASTM D5185m 0 <1	Copper	ppm	ASTM D5185m	>330	3	8	53	
Cadmium ppm ASTM D5185m 0 <1 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 5 Barium ppm ASTM D5185m 0 <1	Tin	ppm	ASTM D5185m	>15	<1	<1	3	
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 3 5 Barium ppm ASTM D5185m 0 <1	Vanadium	ppm	ASTM D5185m		0	<1	0	
Boron ppm ASTM D5185m 0 1 3 5 Barium ppm ASTM D5185m 0 <1 0 <1 Molybdenum ppm ASTM D5185m 60 53 56 54 Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 803 837 779 Calcium ppm ASTM D5185m 1070 980 1017 1029 Phosphorus ppm ASTM D5185m 1150 909 874 889 Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 3 Fuel % ASTM D5185m >20 2 2 3 3 3 Fuel % ASTM D7844 >4 3.7 2.9	Cadmium	ppm	ASTM D5185m		0	<1	0	
Barium ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum ppm ASTM D5185m 60 53 56 54 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 803 837 779 Calcium ppm ASTM D5185m 1070 980 1017 1029 Phosphorus ppm ASTM D5185m 1150 909 874 889 Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D5185m >20 2 3 3 Fuel % ASTM D7844 <	Boron	ppm	ASTM D5185m	0	1	3	5	
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 803 837 779 Calcium ppm ASTM D5185m 1070 980 1017 1029 Phosphorus ppm ASTM D5185m 1150 909 874 889 Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 5 Fuel % ASTM D5185m >20 2 3 3 5 Soot % % </td <td>Barium</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <td><1</td> <td>0</td> <td><1</td>	Barium	ppm	ASTM D5185m	0	<1	0	<1	
Magnesium ppm ASTM D5185m 1010 803 837 779 Calcium ppm ASTM D5185m 1070 980 1017 1029 Phosphorus ppm ASTM D5185m 1150 909 874 889 Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 4.9 4.8 4.8 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624	Molybdenum	ppm	ASTM D5185m	60	53	56	54	
Calcium ppm ASTM D5185m 1070 980 1017 1029 Phosphorus ppm ASTM D5185m 1150 909 874 889 Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 4.9 4.8 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D741	Manganese	ppm	ASTM D5185m	0	<1	<1	<1	
Phosphorus ppm ASTM D5185m 1150 909 874 889 Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 4.9 4.8 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415	Magnesium	ppm	ASTM D5185m	1010	803	837	779	
Zinc ppm ASTM D5185m 1270 1074 1112 1084 Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 4.9 4.8 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method <	Calcium	ppm	ASTM D5185m	1070	980	1017	1029	
Sulfur ppm ASTM D5185m 2060 2659 3298 2544 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m 0 <1	Phosphorus	ppm	ASTM D5185m	1150	909	874	889	
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m 0 <1	Zinc	ppm	ASTM D5185m	1270	1074	1112	1084	
Silicon ppm ASTM D5185m >25 3 3 5 Sodium ppm ASTM D5185m 0 <1 0 Potassium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 4.9 4.8 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Sulfur	ppm	ASTM D5185m	2060	2659	3298	2544	
Sodium ppm ASTM D5185m 0 <1 0 Potassium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 4.9 4.8 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	CONTAMINAN	ITS	method	limit/base	current	history1	history2	
Potassium ppm ASTM D5185m >20 2 3 3 Fuel % ASTM D3524 >3.0 ▲ 4.9 ▲ 4.8 ▲ 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 ▲ 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Silicon	ppm	ASTM D5185m	>25	3	3	5	
Fuel % ASTM D3524 >3.0 ▲ 4.9 ▲ 4.8 ▲ 5.4 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 ▲ 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Sodium	ppm	ASTM D5185m		0	<1	0	
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 3.7 2.9 ▲ 5.3 Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Potassium	ppm	ASTM D5185m	>20	2	3	3	
Soot % % *ASTM D7844	Fuel	%	ASTM D3524	>3.0	4.9	<u>4.8</u>	△ 5.4	
Nitration Abs/cm *ASTM D7624 >20 9.1 8.9 11.7 Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation Abs/.1mm *ASTM D7415 >30 24.0 24.1 29.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Soot %	%	*ASTM D7844	>4	3.7	2.9	△ 5.3	
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Nitration	Abs/cm	*ASTM D7624	>20	9.1	8.9	11.7	
Oxidation Abs/.1mm *ASTM D7414 >25 14.1 15.6 18.2	Sulfation	Abs/.1mm	*ASTM D7415	>30	24.0	24.1	29.8	
	FLUID DEGRA	NOITAC	method	limit/base	current	history1	history2	
Base Number (BN) mg KOH/g ASTM D2896 9.8 7.5 8.0 ▲ 0	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.1	15.6	18.2	
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	7.5	8.0	<u> </u>	



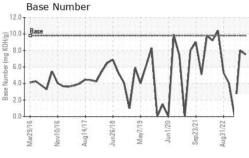
OIL ANALYSIS REPORT



VISUAL		method	limit/base	curi
White Metal	scalar	*Visual	NONE	NON
Yellow Metal	scalar	*Visual	NONE	NON
Precipitate	scalar	*Visual	NONE	NON
Silt	scalar	*Visual	NONE	NON
Debris	scalar	*Visual	NONE	NON
Sand/Dirt	scalar	*Visual	NONE	NONE
Appearance	scalar	*Visual	NORML	NOR
Odor	scalar	*Visual	NORML	NOR
Emulsified Water	scalar	*Visual	>0.2	NEG
Free Water	scalar	*Visual		NEG

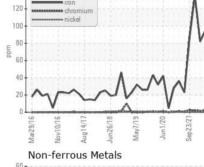
VISUAL		method	imilibase	current	riistory i	HIStoryZ
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
	DTIES		11 11 11		1111	111

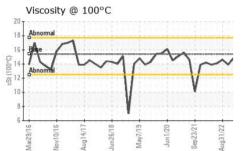
FLUID PROPE	RHES	method	limit/base	current	history1	history
Visc @ 100°C	cSt	ASTM D445	15.4	14.0	13.2	14.8

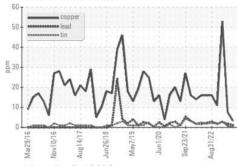


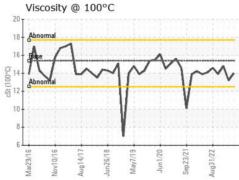


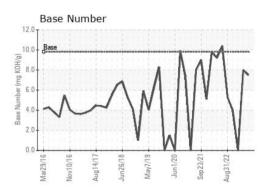
GRAPHS















Certificate L2367

Laboratory

Sample No. Lab Number **Unique Number**

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0094697 : 05973851 : 10685801

Received Diagnosed

: 11 Oct 2023 Diagnostician : Wes Davis

: 10 Oct 2023

Test Package : FLEET (Additional Tests: PercentFuel) 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)

GFL Environmental - 001 - Raleigh(CNG)

3741 Conquest Drive Garner, NC US 27529

Contact: Craig Johnson craig.johnson@gflenv.com

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