

PROBLEM SUMMARY

Sample Rating Trend

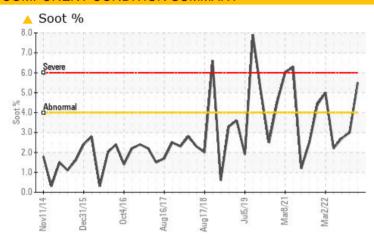
DEGRADATION

Machine Id 2441 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (48 QTS)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. We recommend you service the filters on this component. 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.

PROBLEMATIC TEST RESULTS								
Sample Status				ABNORMAL	NORMAL	NORMAL		
Soot %	%	*ASTM D7844	>4	△ 5.5	3	2.7		
Base Number (BN)	mg KOH/g	ASTM D2896	9.8	△ 0.0	8.4	8.3		

Customer Id: GFL001 Sample No.: GFL0089310 Lab Number: 05964429 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data:

Don Baldridge +1 don.b505@comcast.net

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

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Change Filter			?	We recommend you service the filters on this component.
Alert			?	NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.
Check Combustion			?	We advise that you check for faulty combustion, plugged air filters, or aftercoolers.

HISTORICAL DIAGNOSIS

07 Jul 2023 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

view report

24 Jun 2022 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

view report

12 May 2022 Diag: Wes Davis

NORMAL



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.





OIL ANALYSIS REPORT

Sample Rating Trend



DEGRADATION



Machine Id
2441
Component
Diesel Engine

PETRO CANADA DURON SHP 15W40 (48 QTS)

DIAGNOSIS

Recommendation

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. We recommend you service the filters on this component. 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.

Wear

All component wear rates are normal.

Contamination

There is an abnormal amount of solids and carbon present in the oil.

Fluid Condition

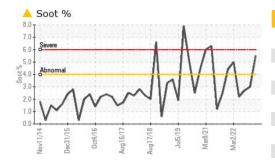
The BN level is low.

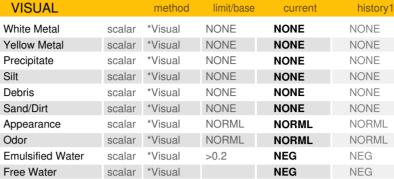
SAMPLE INFORMATION method limit/base current history1 history2	v2014 Dec2015 Occ2016 Aug/2017 Aug/2018 Jul2019 Mec2021 Mec2022						
Sample Date Client Info 28 Sep 2023 07 Jul 2023 24 Jun 2022 Machine Age hrs Client Info 37894 37336 36036 Oil Age hrs Client Info 0 0 445 Oil Changed Client Info Changed N/A Changed Sample Status Client Info Changed N/A Changed CONTAMINATION method limit/base current history1 history2 Fuel WC Method 3.0 < 1.0	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Date Client Info 28 Sep 2023 07 Jul 2023 24 Jun 2022 Machine Age hrs Client Info 37894 37336 36036 Oil Age hrs Client Info 0 0 445 Oil Changed Client Info Changed N/A Changed Sample Status Client Info Changed N/A Changed CONTAMINATION method limit/base current history1 history2 Fuel WC Method 3.0 < 1.0	Sample Number		Client Info		GFL0089310	GFL0087106	GFL0052527
Oil Age hrs Client Info Changed ABNORMAL N/A Changed	Sample Date		Client Info		28 Sep 2023	07 Jul 2023	24 Jun 2022
Oil Changed Sample Status Client Info Changed ABNORMAL N/A Changed NORMAL	Machine Age	hrs	Client Info		37894	37336	36036
Sample Status Method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Age	hrs	Client Info		0	0	445
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Oil Changed		Client Info		Changed	N/A	Changed
Fuel	Sample Status				ABNORMAL	NORMAL	NORMAL
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 46 29 55 Chromium ppm ASTM D5185m >20 <1 <1 1 Nickel ppm ASTM D5185m >5 <1 <1 <1 Silver ppm ASTM D5185m >2 0 <1 <1 Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >2 0 0 <1 Lead ppm ASTM D5185m >40 2 1 5 Copper ppm ASTM D5185m >40 2 1 5 Copper ppm ASTM D5185m 0 0 <1 <1 2 Vanadium ppm ASTM D5185m 0 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 46 29 55 Chromium ppm ASTM D5185m >20 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	46	29	55
Titanium ppm ASTM D5185m >2 0 <1 0 Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >20 2 2 2 Lead ppm ASTM D5185m >40 2 1 5 Copper ppm ASTM D5185m >330 8 6 81 Tin ppm ASTM D5185m >15 <1 <1 2 Vanadium ppm ASTM D5185m 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0 <1 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 <1 <1 <	Chromium	ppm	ASTM D5185m	>20	<1	<1	1
Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >20 2 2 2 Lead ppm ASTM D5185m >40 2 1 5 Copper ppm ASTM D5185m >330 8 6 81 Tin ppm ASTM D5185m >15 <1 <1 2 Vanadium ppm ASTM D5185m 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0 <1 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 0 Molydenum ppm ASTM D5185m 0 1 4 6 8 Manganesium ppm ASTM D5185m 1010	Nickel	ppm	ASTM D5185m	>5	<1	<1	<1
Aluminum ppm ASTM D5185m >20 2 2 2 Lead ppm ASTM D5185m >40 2 1 5 Copper ppm ASTM D5185m >330 8 6 81 Tin ppm ASTM D5185m >15 <1	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Lead ppm ASTM D5185m >40 2 1 5 Copper ppm ASTM D5185m >330 8 6 81 Tin ppm ASTM D5185m >15 <1 <1 2 Vanadium ppm ASTM D5185m 0 <1 <1 <1 Cadmium ppm ASTM D5185m 0 <1 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 0 Manganesium ppm ASTM D5185m 0 <1 <1 <1 <1 Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1270 </td <td>Silver</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>2</td> <th>0</th> <td>0</td> <td><1</td>	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >330 8 6 81 Tin ppm ASTM D5185m >15 <1	Aluminum	ppm	ASTM D5185m	>20	2	2	2
Tin ppm ASTM D5185m >15 <1 <1 2 Vanadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 60 62 59 68 Manganese ppm ASTM D5185m 0 <1	Lead	ppm	ASTM D5185m	>40	2	1	5
Vanadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 62 59 68 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 846 866 871 Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1170 956 899 1055 Zinc ppm ASTM D5185m 200 3144 3345 3031 CONTAMINANTS method limit/base current history1	Copper	ppm	ASTM D5185m	>330	8	6	81
Cadmium ppm ASTM D5185m 0 <1 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 <1	Tin	ppm	ASTM D5185m	>15	<1	<1	2
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 62 59 68 Manganese ppm ASTM D5185m 0 <1	Vanadium	ppm	ASTM D5185m		0	<1	<1
Boron ppm ASTM D5185m 0 1 4 6 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 62 59 68 Manganese 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 <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	Cadmium	ppm	ASTM D5185m		0	<1	<1
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 62 59 68 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 846 866 871 Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1150 956 899 1055 Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m <1 2 35 Potassium ppm ASTM D5185m <1 </th <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 62 59 68 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 846 866 871 Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1150 956 899 1055 Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 >4<	Boron	ppm	ASTM D5185m	0	1	4	6
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 846 866 871 Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1150 956 899 1055 Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 5.5 3 2.7 Nitration Abs/cm *ASTM D741	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 846 866 871 Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1150 956 899 1055 Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 5.5 3 2.7 Nitration Abs/:mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION *ASTM D7414 <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>60</td> <th>62</th> <td>59</td> <td>68</td>	Molybdenum	ppm	ASTM D5185m	60	62	59	68
Calcium ppm ASTM D5185m 1070 1041 1054 1259 Phosphorus ppm ASTM D5185m 1150 956 899 1055 Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % "ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm "ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm "ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 956 899 1055 Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm	Magnesium	ppm		1010	846	866	871
Zinc ppm ASTM D5185m 1270 1176 1146 1322 Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Calcium	ppm	ASTM D5185m	1070	1041	1054	1259
Sulfur ppm ASTM D5185m 2060 3144 3345 3031 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m >20 1 2 35 Potassium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Phosphorus	ppm	ASTM D5185m	1150	956	899	1055
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m <1	Zinc	ppm	ASTM D5185m	1270	1176	1146	1322
Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m < 1 2 35 Potassium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Sulfur	ppm	ASTM D5185m	2060	3144	3345	3031
Sodium ppm ASTM D5185m <1 2 35 Potassium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 1 3 1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Silicon	ppm	ASTM D5185m	>25	4		4
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Sodium	ppm	ASTM D5185m		<1	2	35
Soot % % *ASTM D7844 >4 ▲ 5.5 3 2.7 Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Potassium	ppm	ASTM D5185m	>20	1	3	1
Nitration Abs/cm *ASTM D7624 >20 12.5 9.2 9.9 Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 29.3 24.8 25.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Soot %	%	*ASTM D7844	>4	5.5	3	2.7
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Nitration	Abs/cm	*ASTM D7624	>20	12.5	9.2	9.9
Oxidation Abs/.1mm *ASTM D7414 >25 17.7 15.5 17.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	29.3	24.8	25.5
	FLUID DEGRAI	NOITAC	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 ▲ 0.0 8.4 8.3	Oxidation	Abs/.1mm	*ASTM D7414	>25	17.7	15.5	17.5
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	△ 0.0	8.4	8.3



A Coot 0/

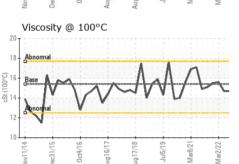
OIL ANALYSIS REPORT





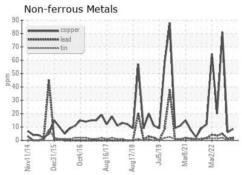
6.0 - Severe				-	- /\	1	
5.0 - Abnom 4.0 - Abnom	nal			-/\			1
	1			~ 11	N	V -	IV
2.0	//	N	V				V
0.0	. 1		11111				1,111,11

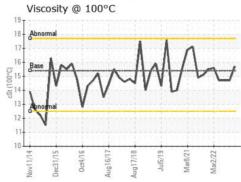
FLUID PROPE	ERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	15.7	14.7	14.7

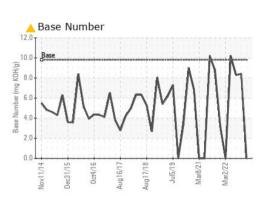


Ferrous Alloys 120 80 E 60

GRAPHS











Certificate L2367

Laboratory Sample No.

Lab Number **Unique Number** Test Package : FLEET

: GFL0089310 : 05964429

: 10670980

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 29 Sep 2023 Diagnosed

Diagnostician

: 01 Oct 2023 : Don Baldridge GFL Environmental - 001 - Raleigh(CNG)

3741 Conquest Drive Garner, NC US 27529

Contact: Craig Johnson craig.johnson@gflenv.com

T: (919)662-7100 F: (919)662-7130

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) history2

NONE

NONE

NONE

NONE

NONE

NONE

NEG

NEG

NORML

NORML