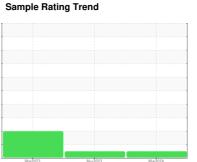


# **OIL ANALYSIS REPORT**









713002 Component **Diesel Engine** 

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

# DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the

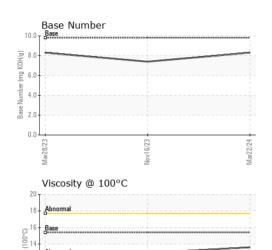
### **Fluid Condition**

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

Sample Date         Client Info         22 Mar 2024         16 Nov 2023         28 Mar 2023           Machine Age         hrs         Client Info         3349         24243         475           Oil Age         hrs         Client Info         24243         2320         0           Oil Changed         Client Info         Not Changed         Changed         Changed           Sample Status         NORMAL         NORMAL         ABNORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         0.4           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         1         7         24			Ma	r2023	Nov2023 Mar20	24	
Sample Date   Client Info   22 Mar 2024   16 Nov 2023   28 Mar 2023	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age   hrs   Client Info   3349   24243   2320   0	Sample Number		Client Info		GFL0096949	GFL0099489	GFL0071380
Oil Age         hrs         Client Info         24243         2320         0           Oil Changed Sample Status         Client Info         Not Changed Changed Changed Changed Changed Changed Changed Changed NoRMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL CONTAINING           CONTAMINATION         method Imitibase current         history1         history2 history2           Fuel         WC Method         >3.0         <1.0	Sample Date		Client Info		22 Mar 2024	16 Nov 2023	28 Mar 2023
Oil Changed Sample Status         Client Info         Not Changed NORMAL         Changed NORMAL         Changed ABNORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0	Machine Age	hrs	Client Info		3349	24243	475
CONTAMINATION	Oil Age	hrs	Client Info		24243	2320	0
Fuel	Oil Changed		Client Info		Not Changd	Changed	Changed
Fuel   WC Method   S3.0   <1.0   <1.0   0.4	Sample Status				NORMAL	NORMAL	ABNORMAL
Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         Imitibase         current         history1         history2           WEAR METALS         method         limitibase         current         history1         history2           Iron         ppm         ASTM D5185m         >120         1         7         24           Chromium         ppm         ASTM D5185m         >5         0         0         2           Nikcel         ppm         ASTM D5185m         >2         0         0         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         1         2         7           Lead         ppm         ASTM D5185m         >40         0         0         <1         88           Tin         ppm         ASTM D5185m         >40         0         0         <1         88           Tin         ppm         ASTM D5185m         >10         0         0         <1         0         3           Vanadium         ppm         ASTM D5185m <td< th=""><th>CONTAMINATI</th><th>ION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	CONTAMINATI	ION	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         1         7         24           Chromium         ppm         ASTM D5185m         >20         <1         0         <1           Nickel         ppm         ASTM D5185m         >20         <0         0         2           Titanium         ppm         ASTM D5185m         >2         0         0         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         <1           Lead         ppm         ASTM D5185m         >20         0         <1         88           Tin         ppm         ASTM D5185m         >15         <1         0         3           Vanadium         ppm         ASTM D5185m         0         0         0         <1           Cadmium         ppm         ASTM D5185m         0         10         8         314	Fuel		WC Method	>3.0	<1.0	<1.0	0.4
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         1         7         24           Chromium         ppm         ASTM D5185m         >20         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1	WEAR METALS	S	method	limit/base	current	history1	history2
Nickel         ppm         ASTM D5185m         >5         0         0         2           Titanium         ppm         ASTM D5185m         >2         0         0         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         1         2         7           Lead         ppm         ASTM D5185m         >40         0         0         <1	Iron	ppm	ASTM D5185m	>120	1	7	24
Titanium         ppm         ASTM D5185m         >2         0         0         0           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         1         2         7           Lead         ppm         ASTM D5185m         >40         0         0         <1         88           Copper         ppm         ASTM D5185m         >330         0         <1         88           Tin         ppm         ASTM D5185m         >15         <1         0         3           Vanadium         ppm         ASTM D5185m         0         0         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         10         8         314           Barium         ppm         ASTM D5185m         0         0         0         0         0           Barium         ppm         ASTM D5185m         1010         85	Chromium	ppm	ASTM D5185m	>20	<1	0	<1
Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         1         2         7           Lead         ppm         ASTM D5185m         >40         0         0         <1         88           Tin         ppm         ASTM D5185m         >330         0         <1         88           Tin         ppm         ASTM D5185m         0         0         <1         0           Vanadium         ppm         ASTM D5185m         0         0         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2         history2           Boron         ppm         ASTM D5185m         0         0         0         0         0         0           Barium         ppm         ASTM D5185m         0         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         1         0         4         3<	Nickel	ppm	ASTM D5185m	>5	0	0	2
Aluminum         ppm         ASTM D5185m         >20         1         2         7           Lead         ppm         ASTM D5185m         >40         0         0         <1	Titanium	ppm	ASTM D5185m	>2	0	0	0
Lead         ppm         ASTM D5185m         >40         0         0         <1         88           Copper         ppm         ASTM D5185m         >330         0         <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Lead         ppm         ASTM D5185m         >40         0         0         <1         88           Copper         ppm         ASTM D5185m         >330         0         <1	Aluminum	ppm	ASTM D5185m	>20	1	2	7
Copper         ppm         ASTM D5185m         >330         0         <1         88           Tin         ppm         ASTM D5185m         >15         <1	Lead				0	0	<1
Tin         ppm         ASTM D5185m         >15         <1         0         3           Vanadium         ppm         ASTM D5185m         0         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         10         8         314           Barium         ppm         ASTM D5185m         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         61         69         122           Manganese         ppm         ASTM D5185m         0         <1         0         4           Magnesium         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306	Copper	• • • • • • • • • • • • • • • • • • • •	ASTM D5185m	>330	0	<1	88
Vanadium         ppm         ASTM D5185m         0         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         10         8         314           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         61         69         122           Manganese         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1150         963         1128         681           Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1 <td>• •</td> <td></td> <td>ASTM D5185m</td> <td>&gt;15</td> <th>&lt;1</th> <td>0</td> <td>3</td>	• •		ASTM D5185m	>15	<1	0	3
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         10         8         314           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         60         61         69         122           Manganese         ppm         ASTM D5185m         0         <1	Vanadium	• • • • • • • • • • • • • • • • • • • •	ASTM D5185m		0	0	<1
Boron         ppm         ASTM D5185m         0         10         8         314           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         61         69         122           Manganese         ppm         ASTM D5185m         0         <1         0         4           Magnesium         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Solium         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m	Cadmium		ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         61         69         122           Manganese         ppm         ASTM D5185m         0         <1         0         4           Magnesium         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         li	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         61         69         122           Manganese         ppm         ASTM D5185m         0         <1         0         4           Magnesium         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1150         963         1128         681           Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         *ASTM D7844         >4	Boron	ppm	ASTM D5185m	0	10	8	314
Manganese         ppm         ASTM D5185m         0         <1         0         4           Magnesium         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1150         963         1128         681           Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7815	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium         ppm         ASTM D5185m         1010         851         954         643           Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1150         963         1128         681           Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         *ASTM D74	Molybdenum	ppm	ASTM D5185m	60	61	69	122
Calcium         ppm         ASTM D5185m         1070         1050         1283         1419           Phosphorus         ppm         ASTM D5185m         1150         963         1128         681           Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         ▲ 129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method	Manganese	ppm	ASTM D5185m	0	<1	0	4
Phosphorus         ppm         ASTM D5185m         1150         963         1128         681           Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm	Magnesium	ppm	ASTM D5185m	1010	851	954	643
Zinc         ppm         ASTM D5185m         1270         1139         1436         871           Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	Calcium	ppm	ASTM D5185m	1070	1050	1283	1419
Sulfur         ppm         ASTM D5185m         2060         3306         3431         2475           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	Phosphorus	ppm	ASTM D5185m	1150	963	1128	681
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         2         4         129           Sodium         ppm         ASTM D5185m         <1	Zinc	ppm	ASTM D5185m	1270	1139	1436	871
Silicon         ppm         ASTM D5185m         >25         2         4         ▲ 129           Sodium         ppm         ASTM D5185m         <1         2         4           Potassium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	Sulfur	ppm	ASTM D5185m	2060	3306	3431	2475
Sodium         ppm         ASTM D5185m         <1         2         4           Potassium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         2         5         19           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	Silicon	ppm	ASTM D5185m	>25	2	4	<b>▲</b> 129
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	Sodium	ppm	ASTM D5185m		<1	2	4
Soot %         %         *ASTM D7844 >4         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624 >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415 >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         13.7         15.0         22.3	Potassium	ppm	ASTM D5185m	>20	2	5	19
Nitration         Abs/cm         *ASTM D7624         >20         5.4         7.2         9.1           Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         17.6         18.7         25.0           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         13.7         15.0         22.3	Soot %	%	*ASTM D7844	>4	0.1	0.2	0.2
FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     13.7     15.0     22.3	Nitration	Abs/cm	*ASTM D7624	>20	5.4	7.2	9.1
Oxidation Abs/.1mm *ASTM D7414 >25 <b>13.7</b> 15.0 22.3	Sulfation	Abs/.1mm	*ASTM D7415	>30	17.6	18.7	25.0
	FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Base Number (BN)         mg KOH/g         ASTM D2896         9.8         8.3         7.4         8.3	Oxidation	Abs/.1mm	*ASTM D7414	>25	13.7	15.0	22.3
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.3	7.4	8.3

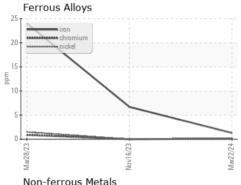


# **OIL ANALYSIS REPORT**

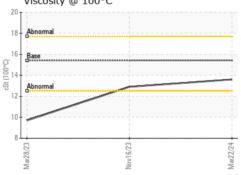


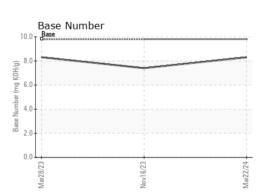
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
	DTIES	mothod	limit/base	current	history1	history?

FLUID FROFER	IIEO	memou			HISTORY	This tory,
Visc @ 100°C	cSt	ASTM D445	15.4	13.6	12.9	9.7



Non-ferrous Metals	
90 T	
80 - copper	
70 lead	
60	
= 50	
E 40	
30	
20	
10	
0	
23	23.
Mar28,23	Nov16/23 Mar22/24
Z Z	N <sub>a</sub>
Viscosity @ 100°C	







Certificate L2367

Laboratory Sample No. Lab Number : 06134478 Unique Number : 10953943

Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0096949

Received **Tested** Diagnosed

: 01 Apr 2024 : 02 Apr 2024 : 02 Apr 2024 - Wes Davis

GFL Environmental - 015 - Columbia

7800 Farrow Road Columbia, SC US 29203-3219

Contact: TECHNICIAN ACCOUNT To discuss this sample report, contact Customer Service at 1-800-237-1369. catherine.anastasio@wearcheck.com

\* - 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)

T:

F: