

# **PROBLEM SUMMARY**

# Sample Rating Trend

**FUEL** 





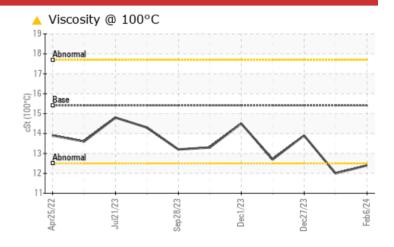
Machine Id 4669M Component

**Diesel Engine** 

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

# **COMPONENT CONDITION SUMMARY**





# RECOMMENDATION

We advise that you check the fuel injection system. 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				SEVERE	SEVERE	NORMAL			
Fuel	%	ASTM D3524	>5	<b>8.4</b>	10.2	<1.0			
Visc @ 100°C	cSt	ASTM D445	15.4	<b>12.4</b>	<b>△</b> 12.0	13.9			

Customer Id: GFL410 Sample No.: GFL0110072 Lab Number: 06083393 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

# Action Status Date Done By Description Resample --- ? We recommend an early resample to monitor this condition. Check Fuel/injector System --- ? We advise that you check the fuel injection system.

# HISTORICAL DIAGNOSIS

### 10 Jan 2024 Diag: Jonathan Hester

FUEL



We advise that you check the fuel injection system. We recommend that you drain the oil and perform a filter service on this component if not already done. We recommend an early resample to monitor this condition.All component wear rates are normal. There is a high amount of fuel present in the oil. Fuel is present in the oil and is lowering the viscosity. 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 Dec 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

# 07 Dec 2023 Diag: Don Baldridge

NORMAL



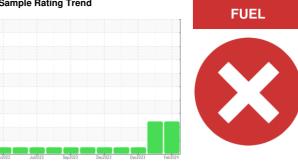
Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.





# **OIL ANALYSIS REPORT**

# Sample Rating Trend





Machine Id 4669M Component **Diesel Engine** 

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

# **DIAGNOSIS**

## Recommendation

We advise that you check the fuel injection system. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

## Wear

All component wear rates are normal.

## Contamination

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

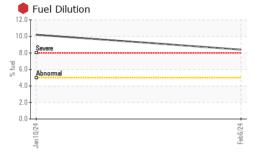
## ▲ Fluid Condition

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

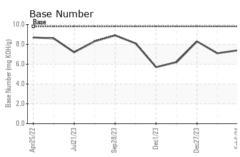
SAMPLE INFORMATION   method   limit/base   current   history1   history2	N SHP 15W40 (	- GAL)	Apr2022	Jul2023 Sep2023	Dec2023 Dec2023	Feb 2024	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Client Info	Sample Number		Client Info		GFL0110072	GFL0104185	GFL0104274
Machine Age         hrs         Client Info         17587         115370         114646           Oil Age         hrs         Client Info         600         113235         113379           Oil Changed         Client Info         Changed         N/A         N/A           Sample Status         SEVERE         SEVERE         SEVERE           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         Imit base         current         history1         history2           Iron         ppm         ASTM D5185m         >80         6         2         14           Chromium         ppm         ASTM D5185m         >2         <1			Client Info		06 Feb 2024	10 Jan 2024	27 Dec 2023
Dil Age	•	hrs					
Client Info			Client Info				
Sever   Sever   Sever   Sever   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         >80         6         2         14           Chromium         ppm         ASTM D5185m         >5         <1         0         <1           Nickel         ppm         ASTM D5185m         >2         <1         0         <1           Silver         ppm         ASTM D5185m         >2         <1         0         <1           Silver         ppm         ASTM D5185m         >30         <1         0         <1           Copper         ppm         ASTM D5185m         >30         <1         0         <1           Copper         ppm         ASTM D5185m         >5         <1         0         <1           Tin         ppm         ASTM D5185m         >5         <1         0         <1           ADDITIVES         method         limit/base         current         history1         history2           Barium </td <td>-</td> <td></td> <td></td> <td></td> <th>_</th> <td></td> <td></td>	-				_		
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         >80         6         2         14           Chromium         ppm         ASTM D5185m         >5         <1         0         <1           Nickel         ppm         ASTM D5185m         >2         <1         0         <1           Silver         ppm         ASTM D5185m         >2         <1         0         <1           Silver         ppm         ASTM D5185m         >30         <1         0         <1           Copper         ppm         ASTM D5185m         >30         <1         0         <1           Copper         ppm         ASTM D5185m         >5         <1         0         <1           Tin         ppm         ASTM D5185m         >5         <1         0         <1           ADDITIVES         method         limit/base         current         history1         history2           Barium </td <td>CONTAMINAT</td> <td>ION</td> <td>method</td> <td>limit/base</td> <th>current</th> <td>history1</td> <td>history2</td>	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >80         6         2         14           Chromium         ppm         ASTM D5185m         >5         <1			WC Method	>0.2	NEG		
Concording   Co	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >5         <1         0         <1           Nickel         ppm         ASTM D5185m         >2         <1         0         <1           Titianium         ppm         ASTM D5185m         >2         <1         0         <1           Siliver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >30         4         2         2           Lead         ppm         ASTM D5185m         >30         <1         0         0           Copper         ppm         ASTM D5185m         >5         <1         0         <1           Tin         ppm         ASTM D5185m         >5         <1         0         0           Vanadium         ppm         ASTM D5185m         0         <1         0         0           Cadmium         ppm         ASTM D5185m         0         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Barium         ppm         ASTM D5185m         0         <1         0         <	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>80	6	2	14
Stilver	Chromium	ppm	ASTM D5185m	>5	<1	0	<1
Saliver	Nickel	ppm	ASTM D5185m	>2	<1	0	0
Aluminum ppm ASTM D5185m >30 4 2 2 2 Lead ppm ASTM D5185m >30 <1 0 0 Copper ppm ASTM D5185m >150 <1 0 0 Cadmium ppm ASTM D5185m >5 <1 0 0 Cadmium ppm ASTM D5185m >5 <1 0 0 Cadmium ppm ASTM D5185m >6 0 0 Cadmium ppm ASTM D5185m 0 <1 0 0 Cadmium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 1 Cadmium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 0 0 0 0 0 0 0 Calcium ppm ASTM D5185m 1010 770 774 965 Calcium ppm ASTM D5185m 1070 891 835 1088 Phosphorus ppm ASTM D5185m 1150 864 782 1024 Zinc ppm ASTM D5185m 1270 1035 1075 1253 Calcium ppm ASTM D5185m 1270 1035 1075 1253 Calcium ppm ASTM D5185m 2060 2868 2448 3016  CONTAMINANTS method limit/base current history1 history2 Contact ppm ASTM D5185m >20 4 2 3 Contact ppm ASTM D5185m >20 4 2 3 Contact ppm ASTM D5185m >20 11 6 2 CONTAMINANTS method limit/base current history1 history2 Contact ppm ASTM D5185m >20 11 6 2 CONTAMINANTS method limit/base current history1 history2 Contact ppm ASTM D7844 >3 0.2 0.2 0.5 Contact ppm ASTM D7844 >3 0.2 0.2 0.	Titanium	ppm	ASTM D5185m		<1	0	<1
Lead         ppm         ASTM D5185m         >30         <1         0         0           Copper         ppm         ASTM D5185m         >150         <1         0         <1           Tin         ppm         ASTM D5185m         >5         <1         0         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         0         0           Barium         ppm         ASTM D5185m         0         <1         0         0           Barium         ppm         ASTM D5185m         0         <1         0         0           Manganese         ppm         ASTM D5185m         1010         770         774         965           Calcium         ppm         ASTM D5185m         1010         770         774         965           Zinc         ppm         ASTM D5185m         12270         1035         1075 <td>Silver</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;3</td> <th>0</th> <td>0</td> <td>0</td>	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper	Aluminum	ppm	ASTM D5185m	>30	4	2	2
Trin	_ead	ppm	ASTM D5185m	>30	<1	0	0
Property   Content   Co	Copper	ppm	ASTM D5185m	>150	<1	0	<1
Vanadium         ppm         ASTM D5185m         0         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         0         1           Barium         ppm         ASTM D5185m         0         <1         0         0           Molybdenum         ppm         ASTM D5185m         0         50         45         59           Manganese         ppm         ASTM D5185m         0         0         0         <1         0           Magnesium         ppm         ASTM D5185m         1010         770         774         965           Calcium         ppm         ASTM D5185m         1070         891         835         1088           Phosphorus         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         hi	Γin	ppm	ASTM D5185m	>5	<1	0	0
Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         0         1           Barium         ppm         ASTM D5185m         0         <1         0         0           Molybdenum         ppm         ASTM D5185m         60         50         45         59           Manganese         ppm         ASTM D5185m         0         0         0         0         <1           Magnesium         ppm         ASTM D5185m         1010         770         774         965           Calcium         ppm         ASTM D5185m         1070         891         835         1088           Phosphorus         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Solium         ppm         ASTM D5185m         >20	/anadium		ASTM D5185m		0	0	0
Boron	Cadmium		ASTM D5185m		<1	0	0
Barium         ppm         ASTM D5185m         0         <1         0         0           Molybdenum         ppm         ASTM D5185m         60         50         45         59           Manganese         ppm         ASTM D5185m         0         0         0         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         50         45         59           Manganese         ppm         ASTM D5185m         0         0         0         <1	Boron	ppm	ASTM D5185m	0	<1	0	1
Manganese         ppm         ASTM D5185m         0         0         <1           Magnesium         ppm         ASTM D5185m         1010         770         774         965           Calcium         ppm         ASTM D5185m         1070         891         835         1088           Phosphorus         ppm         ASTM D5185m         1150         864         782         1024           Zinc         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         10.	Barium	ppm	ASTM D5185m	0	<1	0	0
Magnesium         ppm         ASTM D5185m         1010         770         774         965           Calcium         ppm         ASTM D5185m         1070         891         835         1088           Phosphorus         ppm         ASTM D5185m         1150         864         782         1024           Zinc         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5844         >3	Molybdenum	ppm	ASTM D5185m	60	50	45	59
Calcium         ppm         ASTM D5185m         1070         891         835         1088           Phosphorus         ppm         ASTM D5185m         1150         864         782         1024           Zinc         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Soot %         %         *ASTM D5185m         >20         10.2         <1.0	Manganese	ppm	ASTM D5185m	0	0	0	<1
Phosphorus         ppm         ASTM D5185m         1150         864         782         1024           Zinc         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D3524         >5         8.4         10.2         <1.0	Magnesium	ppm	ASTM D5185m	1010	770	774	965
Zinc         ppm         ASTM D5185m         1270         1035         1075         1253           Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D3524         >5         8.4         10.2         <1.0	Calcium	ppm	ASTM D5185m	1070	891	835	1088
Sulfur         ppm         ASTM D5185m         2060         2868         2448         3016           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         <1	Phosphorus	ppm	ASTM D5185m	1150	864	782	1024
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         2         3           Sodium         ppm         ASTM D5185m         <1	Zinc	ppm	ASTM D5185m	1270	1035	1075	1253
Solition   ppm   ASTM D5185m   >20   4   2   3	Sulfur	ppm	ASTM D5185m	2060	2868	2448	3016
Sodium	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         11         6         2           Fuel         %         ASTM D3524         >5         ■ 8.4         ■ 10.2         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         0.2         0.5           Nitration         Abs/cm         *ASTM D7624         >20         12.2         12.2         7.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         21.3         21.9         19.3           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.6         25.0         15.6	Silicon	ppm	ASTM D5185m	>20	4	2	3
Fuel % ASTM D3524 >5	Sodium	ppm	ASTM D5185m		<1	3	1
INFRA-RED	Potassium	ppm	ASTM D5185m	>20	11	6	2
Soot %         %         *ASTM D7844         >3         0.2         0.2         0.5           Nitration         Abs/cm         *ASTM D7624         >20         12.2         12.2         7.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         21.3         21.9         19.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.6         25.0         15.6	Fuel	%	ASTM D3524	>5	● 8.4	10.2	<1.0
Nitration         Abs/cm         *ASTM D7624         >20         12.2         12.2         7.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         21.3         21.9         19.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.6         25.0         15.6	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         12.2         12.2         7.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         21.3         21.9         19.3           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.6         25.0         15.6	Soot %	%	*ASTM D7844	>3	0.2	0.2	0.5
Sulfation         Abs/.1mm         *ASTM D7415         >30         21.3         21.9         19.3           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         23.6         25.0         15.6	Vitration	Abs/cm	*ASTM D7624	>20			
Oxidation	Sulfation		*ASTM D7415				
	FLUID DEGRA	OATION	method	limit/base	current	historv1	history2
					Garront	,	
	Oxidation			>25			15.6



# **OIL ANALYSIS REPORT**



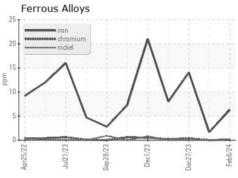
▲ Visco	sity @ 1	00°C			
18 - Abnorm	al				
17- 316 - Base					
Base 15 14 13 Abnorm	al	\_	/	$\wedge$	
12					
Apr25/22	Jul21/23	Sep 28/23	Dec1/23	Dec27/23	Eake 19A

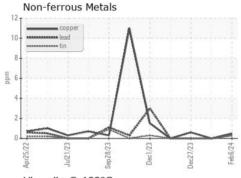


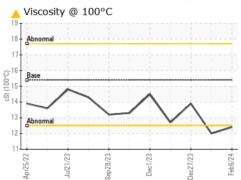
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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

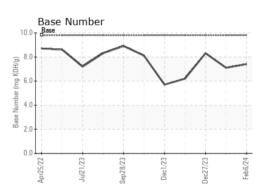
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	<b>12.4</b>	<b>▲</b> 12.0	13.9

# **GRAPHS**













Laboratory Sample No. Lab Number : 06083393 Unique Number: 10870838

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

: GFL0110072

Received **Tested** 

: 08 Feb 2024 : 09 Feb 2024 Diagnosed

: 09 Feb 2024 - Wes Davis

GFL Environmental - 410 - Michigan West 39000 Van Born Rd

Wayne, MI US 48184

Contact: Belal Dgheish bdgheish@gflenv.com T: (734)714-2340

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.

Test Package: FLEET (Additional Tests: PercentFuel)

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)