

## **OIL ANALYSIS REPORT**



NORMAL

# Machine Id

Component

### **Diesel Engine**

#### PETRO CANADA DURON SHP 15W40 (8 GAL)

#### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

#### Fluid Condition

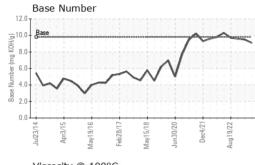
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

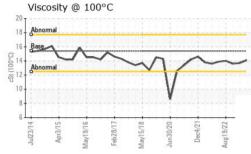
Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         2         5         12           Ohromium         ppm         ASTM D5185m         >20         2         5         12           Nickel         ppm         ASTM D5185m         >5         <1         <1         2           Silver         ppm         ASTM D5185m         >2         <1         <1         2           Lead         ppm         ASTM D5185m         >20         3         ▲ 8         22           Copper         ppm         ASTM D5185m         >20         3         ▲ 8         22           Lead         ppm         ASTM D5185m         >20         3         ▲ 8         22           Copper         ppm         ASTM D5185m         >30         <1         5         8           Tin         ppm         ASTM D5185m         0         0         0         0           Caddium         ppm         ASTM D5185m         0         0         0         0							
SAMPLE INFORMATION         method         limit/base         current         history1         history2           Sample Number         Client Info         GFL0080588         GFL0086588         GFL0086581         GFL0055900           Sample Date         Client Info         14 Aug 2023         04 Jul 2023         28 Feb 2023           Machine Age         hrs         Client Info         509420         509420         509420           Oil Age         hrs         Client Info         Changed         Changed         Changed           Sample Status         NORMAL         ABNORMAL         SEVERE         CONTAMINATION         method         Imit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           foron         ppm         ASTM D5185m<>20         2         5         12           Nockel         ppm         ASTM D5185m<>20         3         8         22           Itaaiu         ppm <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>							
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Sample Number         Client Info         GFL0080588         GFL0066871         GFL0055900           Sample Date         Client Info         14 Aug 2023         04 Jul 2023         28 Feb 2023           Machine Age         hrs         Client Info         509420         509420         509420           Oil Age         hrs         Client Info         Changed         Changed         Changed           Oil Changed         Client Info         Changed         Changed         Changed         Changed           Sample Status         Imit hold         Imit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1         <1         2         <12           Kron         ppm         ASTM D5185m         >20         0         0         0         2           Itrainium         ppm         ASTM D5185m         >20         0<	AL)		il2014 Apr20	115 May2016 Feb2017	May2018 Jun2020 Dec2021	Aug2022	
Sample Number         Client Info         GFL0080588         GFL0066871         GFL0055900           Sample Date         Client Info         14 Aug 2023         04 Jul 2023         28 Feb 2023           Machine Age         hrs         Client Info         509420         509420         509420           Oil Age         hrs         Client Info         Changed         Changed         Changed           Oil Changed         Client Info         Changed         Changed         Changed         Changed           Sample Status         Imit hold         Imit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1.0         <1.0         <1.0           Gruon         ppm         ASTM D5165m         >20         2         5         12           Nickel         ppm         ASTM D5165m         >20         0         0         0           Aluminum         ppm         ASTM D5165m         >20         3         4         8         22           Copper         ppm         ASTM D5165m         >15         <1         1         1 <th>SAMPLE INFOR</th> <th>RMATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFOR	RMATION	method	limit/base	current	history1	history2
Sample Date         Client Info         14 Aug 2023         04 Jul 2023         28 Feb 2023           Machine Age         hrs         Client Info         509420         509420         509420           Oil Age         hrs         Client Info         509420         509420         509420           Oil Changed         Client Info         Somple Status         NORMAL         ABNORMAL         SEVERE           CONTAMINATION         method         Imit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1.0         <1.0         <1.0           Romin         ppm         ASTM DS165m         >120         19         54         73           Chromium         ppm         ASTM DS165m         >20         2         5         12           Nickel         ppm         ASTM DS165m         >2         <1         <1         2           Silver         ppm         ASTM DS165m         >30         <1         5         8           Tin         ppm         ASTM DS165m         >30         <1         5         8	Sample Number		Client Info		GEI 0080588		GEL 0055900
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Oil Age         hrs         Client Info         509420         509420         509420         509420           Oil Changed         Client Info         Changed         Changed         Changed         Changed           Sample Status         Imit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1.0         NEG         NEG           WEAR METALS         method         Imit/base         current         history1         history2           Iron         ppm         ASTM D5155m         >120         19         54         73           Chromium         ppm         ASTM D5155m         >20         2         5         12           Nickel         ppm         ASTM D5155m         >2         0         0         0           Aluminum         ppm         ASTM D5155m         >20         0         0         0           Silver         ppm         ASTM D5155m         >330         <1         5         8           Tina         pm         ASTM D5155m         >15         <1         <1         1		hre			-		
Oil Changed Sample Status       Client Info       Changed NORMAL       Changed ABNORMAL       Changed ABNORMAL       Changed SEVERE         CONTAMINATION       method       limit/base       current       history1       history2         Fuel       WC Method       >3.0       <1.0       <1.0       <1.0         Glycol       WC Method       >3.0       <1.0       <1.0       <1.0         WEAR METALS       method       limit/base       current       history1       history2         Iron       ppm       ASTM D5185m       >20       2       5       12         Nickel       ppm       ASTM D5185m       >20       2       0       0         Aluminum       ppm       ASTM D5185m       >20       3       & 8       22         Lead       ppm       ASTM D5185m       >20       3       & 8       22         Copper       ppm       ASTM D5185m       >15       <1       1       1         Vanadium       pm       ASTM D5185m       >15       <1       1       1         Vanadium       pm       ASTM D5185m       0       0       0       0         Copper       ppm       ASTM D5185m       0	•						
Sample Status         NORMAL         ABNORMAL         SEVERE           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         2         5         12           Nickel         ppm         ASTM D5185m         >20         2         1         <1         2           Silver         ppm         ASTM D5185m         >20         3         & 8         2         2           Lead         ppm         ASTM D5185m         >20         3         & 8         2         2           Copper         ppm         ASTM D5185m         >40         0         <1         2         2           Lead         ppm         ASTM D5185m         0         0         0         0         0           Copper         ppm         ASTM D5185m         0         6         7         8<	-	1115					
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >3.0         <1.0         <1.0         <1.0           Glycol         WC Method         >3.0         <1.0         <1.0         <1.0           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         19         54         73           Chromium         ppm         ASTM D5185m         >20         2         5         12           Nickel         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         0           Lead         ppm         ASTM D5185m         >330         <1         5         8         1           Vanadium         ppm         ASTM D5185m         >40         0         0         0         0           Copper         ppm         ASTM D5185m         0         0         0         0         0           Cadmium         ppm         ASTM D5185m         0 <td< th=""><th>-</th><th></th><th>Chefit IIIIO</th><th></th><th>-</th><th>Ũ</th><th></th></td<>	-		Chefit IIIIO		-	Ũ	
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WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         19         54         73           Chromium         ppm         ASTM D5185m         >20         2         5         12           Nickel         ppm         ASTM D5185m         >5         <1         <1         2           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         3         A         8         22           Lead         ppm         ASTM D5185m         >20         3         A         8         22           Copper         ppm         ASTM D5185m         >30         <1         5         8           Tin         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         6         7         8           Barium         ppm         ASTM D5185m         0         0<	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
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Iron       ppm       ASTM D5185m       >120       19       54       73         Chromium       ppm       ASTM D5185m       >20       2       5       12         Nickel       ppm       ASTM D5185m       >5       <1       <1       2         Titanium       ppm       ASTM D5185m       >2       <1       <1       2         Silver       ppm       ASTM D5185m       >2       0       0       0         Aluminum       ppm       ASTM D5185m       >20       3       ▲ 8       ▲ 22         Lead       ppm       ASTM D5185m       >40       0       <1       2         Copper       ppm       ASTM D5185m       >40       0       <1       1         Vanadium       ppm       ASTM D5185m       0       0       0       0         Cadmium       ppm       ASTM D5185m       0       6       7       8         Barium       ppm       ASTM D5185m       0       6       7       8         Barium       ppm       ASTM D5185m       0       0       0       0         Molybdenum       ppm       ASTM D5185m       010       0       11	WEAR META	S	method	limit/base	current	historv1	historv2
Chromium         ppm         ASTM D5185m         >20         2         5         12           Nickel         ppm         ASTM D5185m         >5         <1         <1         2           Titanium         ppm         ASTM D5185m         >2         <1         <1         2           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         3         ▲ 8         ▲ 22           Lead         ppm         ASTM D5185m         >20         3         ▲ 8         ▲ 22           Lead         ppm         ASTM D5185m         >40         0         <1         2           Copper         ppm         ASTM D5185m         >330         <1         5         8           Tin         ppm         ASTM D5185m         >15         <1         <1         1           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         6         7         8           Barium         ppm         ASTM D5185m         0         <1         1							
Nickel       ppm       ASTM D5185m       >5       <1	-				-		
Titanium       ppm       ASTM D5185m       >2       <1							
Silver       ppm       ASTM D5185m       >2       0       0       0         Aluminum       ppm       ASTM D5185m       >20       3       ▲       8       ▲       22         Lead       ppm       ASTM D5185m       >40       0       <1							
Aluminum       ppm       ASTM D5185m       >20       3       ▲ 8       ▲ 22         Lead       ppm       ASTM D5185m       >40       0       <1       2         Copper       ppm       ASTM D5185m       >330       <1       5       8         Tin       ppm       ASTM D5185m       >15       <1       <1       1         Vanadium       ppm       ASTM D5185m       >15       <1       <1       1         Vanadium       ppm       ASTM D5185m       0       0       0       0         Cadmium       ppm       ASTM D5185m       0       6       7       8         Boron       ppm       ASTM D5185m       0       6       7       8         Barium       ppm       ASTM D5185m       0       0       0       0         Molybdenum       ppm       ASTM D5185m       0       <1       1       1         Magnesium       ppm       ASTM D5185m       0       <1       1       1         Magnesium       ppm       ASTM D5185m       1010       925       961       799         Calcium       ppm       ASTM D5185m       1070       1044       1							_
Lead         ppm         ASTM D5185m         >40         0         <1					-		-
Copper         ppm         ASTM D5185m         >330         <1							
Tin         ppm         ASTM D5185m         >15         <1					-		
Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         6         7         8           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         6         7         8           Manganese         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         1010         925         961         799           Calcium         ppm         ASTM D5185m         1070         1044         1098         1150           Phosphorus         ppm         ASTM D5185m         1270         1248         1295         1125           Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current							
Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         6         7         8           Barium         ppm         ASTM D5185m         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0         0         0         0           Manganese         ppm         ASTM D5185m         0         <1				>15			
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Boron         ppm         ASTM D5185m         0         6         7         8           Barium         ppm         ASTM D5185m         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         57         62         61           Manganese         ppm         ASTM D5185m         0         <1         1         1           Magnesium         ppm         ASTM D5185m         1010         925         961         799           Calcium         ppm         ASTM D5185m         1010         925         961         799           Calcium         ppm         ASTM D5185m         1070         1044         1098         1150           Phosphorus         ppm         ASTM D5185m         1270         1248         1295         1125           Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         28         82           Sodium         ppm         ASTM D5185m		ppm	ASTM D5185m			0	0
Barium       ppm       ASTM D5185m       0       0       0       0       0         Molybdenum       ppm       ASTM D5185m       60       57       62       61         Manganese       ppm       ASTM D5185m       0       <1       1       1         Magnesium       ppm       ASTM D5185m       0       <1       1       1         Magnesium       ppm       ASTM D5185m       1010       925       961       799         Calcium       ppm       ASTM D5185m       1070       1044       1098       1150         Phosphorus       ppm       ASTM D5185m       1270       1248       1295       1125         Sulfur       ppm       ASTM D5185m       2060       3682       3835       3066         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m<>25       8       28       82         Sodium       ppm       ASTM D5185m       20       <1       2       <1         Potassium       ppm       ASTM D5185m       >20       <1       6       8	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         57         62         61           Manganese         ppm         ASTM D5185m         0         <1         1         1           Magnesium         ppm         ASTM D5185m         0         <1         1         1           Magnesium         ppm         ASTM D5185m         1010         925         961         799           Calcium         ppm         ASTM D5185m         1070         1044         1098         1150           Phosphorus         ppm         ASTM D5185m         1150         1027         1065         983           Zinc         ppm         ASTM D5185m         1270         1248         1295         1125           Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         28         82           Sodium         ppm         ASTM D5185m         >20         <1         2         <1	Boron	ppm	ASTM D5185m	0	6	7	8
Manganese       ppm       ASTM D5185m       0       <1       1       1         Magnesium       ppm       ASTM D5185m       1010       925       961       799         Calcium       ppm       ASTM D5185m       1010       925       961       799         Calcium       ppm       ASTM D5185m       1070       1044       1098       1150         Phosphorus       ppm       ASTM D5185m       1150       1027       1065       983         Zinc       ppm       ASTM D5185m       1270       1248       1295       1125         Sulfur       ppm       ASTM D5185m       2060       3682       3835       3066         CONTTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >25       8       28       82         Sodium       ppm       ASTM D5185m       >20       <1       2       <1         Potassium       ppm       ASTM D5185m       >20       <1       6       8	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium       ppm       ASTM D5185m       1010       925       961       799         Calcium       ppm       ASTM D5185m       1070       1044       1098       1150         Phosphorus       ppm       ASTM D5185m       1150       1027       1065       983         Zinc       ppm       ASTM D5185m       1270       1248       1295       1125         Sulfur       ppm       ASTM D5185m       2060       3682       3835       3066         CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m       >25       8       28       82         Sodium       ppm       ASTM D5185m       >20       <1	Molybdenum	ppm	ASTM D5185m	60	57	62	61
Calcium         ppm         ASTM D5185m         1070         1044         1098         1150           Phosphorus         ppm         ASTM D5185m         1150         1027         1065         983           Zinc         ppm         ASTM D5185m         1270         1248         1295         1125           Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         ▲ 28<         82           Sodium         ppm         ASTM D5185m         >20         <1         2         <1           Potassium         ppm         ASTM D5185m         >20         <1         6         8	Manganese	ppm	ASTM D5185m	0	<1		
Phosphorus         ppm         ASTM D5185m         1150         1027         1065         983           Zinc         ppm         ASTM D5185m         1270         1248         1295         1125           Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         ▲ 28<	Magnesium	ppm		1010	925	961	799
Zinc         ppm         ASTM D5185m         1270         1248         1295         1125           Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         ▲ 28<         ● 82           Sodium         ppm         ASTM D5185m         < 1         2         <1           Potassium         ppm         ASTM D5185m         >20         <1         6         8	Calcium	ppm	ASTM D5185m	1070	1044	1098	1150
Sulfur         ppm         ASTM D5185m         2060         3682         3835         3066           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         28         82           Sodium         ppm         ASTM D5185m         <1         2         <1           Potassium         ppm         ASTM D5185m         >20         <1         6         8	Phosphorus	ppm	ASTM D5185m	1150	1027	1065	983
CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185m<>25       8       ▲ 28       ● 82         Sodium       ppm       ASTM D5185m       <1       2       <1         Potassium       ppm       ASTM D5185m       >20       <1       6       8	Zinc	ppm	ASTM D5185m	1270	1248	1295	1125
Silicon         ppm         ASTM D5185m         >25         8         28         82           Sodium         ppm         ASTM D5185m         <1	Sulfur	ppm	ASTM D5185m	2060	3682	3835	3066
Sodium         ppm         ASTM D5185m         <1	CONTAMINA	NTS	method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185m         <1         2         <1           Potassium         ppm         ASTM D5185m         >20         <1         6         8	Silicon	ppm	ASTM D5185m	>25	8	<b>2</b> 8	82
Potassium         ppm         ASTM D5185m         >20         <1         6         8	Sodium						
	Potassium			>20			
	INFRA-RED		method	limit/base		historv1	history2

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844	>4	1.1	1.1	0.8
Nitration	Abs/cm	*ASTM D7624	>20	5.4	6.7	5.9
Sulfation	Abs/.1mm	*ASTM D7415	>30	18.2	20.3	18.7
FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	12.3	14.9	13.0
Base Number (BN)	ma KOH/a	ASTM D2896	9.8	9.1	9.5	9.6

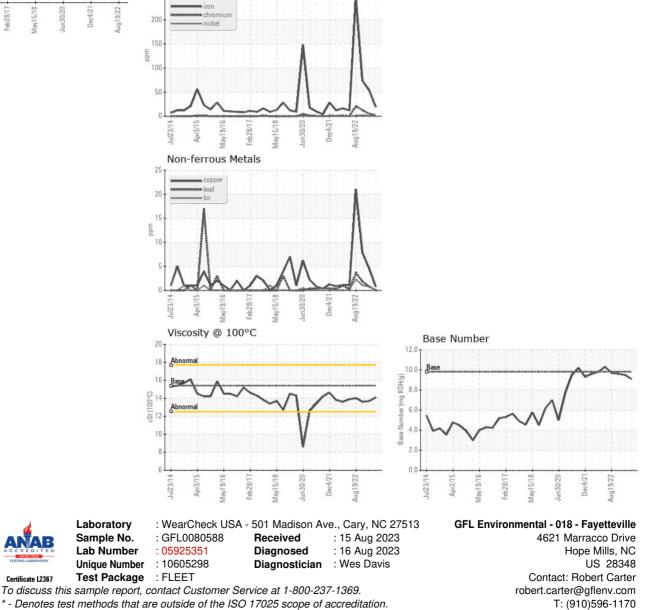


## **OIL ANALYSIS REPORT**





VISUAL		method	limit/base	current	history1	history2
VISUAL		method	IIIIII/Dase	current	TIISTOLA	nistory2
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
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.4	14.1	13.7	13.6
GRAPHS						
Ferrous Alloys						



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

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