

OIL ANALYSIS REPORT



(00498H8) 2488 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (36 QTS)



Sample Rating Trend



DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. 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

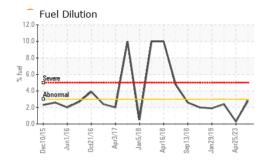
Fluid Condition

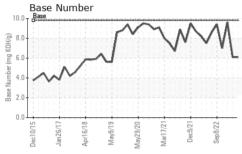
The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.

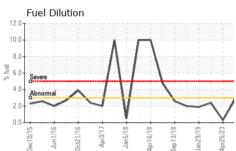
Sample Date Client Info 27 Feb 2024 08 Nov 2023 07 Aug 2023	JN SHP 15W40 (36 Q1S)						
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 600 600 600 600 Oil Age hrs Client Info 600 600 600 600 Oil Changed Changed Changed Changed Changed Changed Changed Changed Sample Status Image: Contract Info ATTENTION ATTENTION ATTENTION ABNORMAL CONTAMINATION method Imitibase current history1 history2 Water WC Method NEG NEG NEG NEG Iron ppm ASTM D5165m >120 2 11 6 Chromium ppm ASTM D5165m >20 -1 <1 1 6 Iron ppm ASTM D5165m >2 <1 <1 0 0 Alteral ppm ASTM D5165m >2 <1 <1 0 0 Alteral ppm ASTM D5165m >2 <1 <1 0 0 Alteral p	Sample Number		Client Info		GFL0099752	GFL0073293	GFL0073305
Machine Age hrs Client Info 600 600 600 600 Oil Age hrs Client Info 600 600 600 600 Oil Changed Client Info Changed Changed Changed Changed ARDRMAL CONTAMINATION method Imitibase current history1 history2 Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imitibase current history1 history2 Iron ppm ASTM D5185m >12.0 2 11 6 Chromium ppm ASTM D5185m >20 <1	Sample Date		Client Info		27 Feb 2024	08 Nov 2023	07 Aug 2023
Oil Changed Sample Status Client Info Changed ATTENTION Changed ATTENTION Changed ATTENTION ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 2 11 6 6 Chromium ppm ASTM D5185m >20 <1	Machine Age	hrs	Client Info		600	600	_
Oil Changed Sample Status Client Info Changed ATTENTION Changed ATTENTION Changed ATTENTION ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 2 11 6 6 Chromium ppm ASTM D5185m >20 <1	Oil Age	hrs	Client Info		600	600	600
ATTENTION ATTENTION ABNORMAL	-					Changed	Changed
Water Glycol WC Method WC Method >0.2 NEG NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >12.0 2 11 6 Chromium ppm ASTM D5185m >2.0 <1					_		
WEAR METALS method Imitibase ourrent history1 history2 Iron ppm ASTM D5185m >120 2 11 6 Chromium ppm ASTM D5185m >20 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method Imitibase ourrent history1 history2 Iron ppm ASTM D5185m >120 2 11 6 Chromium ppm ASTM D5185m >20 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Pron	Glycol				NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >5 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	2	11	6
Titanium	Chromium		ASTM D5185m	>20	<1	<1	<1
Titanium ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 2 4 8 Lead ppm ASTM D5185m >40 0 <1 0 Copper ppm ASTM D5185m >330 3 2 2 Tin ppm ASTM D5185m 0 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 12 13 33 Boron ppm ASTM D5185m 0 12 13 33 Barium ppm ASTM D5185m 0 12 13 33 Barium ppm ASTM D5185m 0 49 81 88 Barium ppm ASTM D5185m 0 41 41 1	Nickel	ppm	ASTM D5185m	>5	<1	<1	0
Silver	Titanium		ASTM D5185m	>2	<1	0	0
Aluminum ppm ASTM D5185m >20 2 4 8 Lead ppm ASTM D5185m >40 0 <1							
Lead ppm ASTM D5185m >40 0 <1 0 Copper ppm ASTM D5185m >330 3 2 2 Tin ppm ASTM D5185m >15 <1 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 12 13 33 Boron ppm ASTM D5185m 0 0 0 0 Boron ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 49 81 88 Manganese ppm ASTM D5185m 0 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 642 738 853 Calcium ppm ASTM D5185m 1070 748 1217 106 Zinc ppm ASTM D5185m 1270 1001	Aluminum		ASTM D5185m			4	8
Copper ppm ASTM D5185m >330 3 2 2 Tin ppm ASTM D5185m >15 <1						<1	
Tin							
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Boron					-		
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 49 81 88 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 642 738 853 Calcium ppm ASTM D5185m 1070 748 1217 1036 Phosphorus ppm ASTM D5185m 1150 831 932 924 Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m 1 13 201 Potassium ppm ASTM D5185m 20 <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 49 81 88 Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 642 738 853 Calcium ppm ASTM D5185m 1070 748 1217 1036 Phosphorus ppm ASTM D5185m 1150 831 932 924 Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m >20 <1 2 53 Fuel % ASTM D5185m >20 <1 2 53 Fuel % ASTM D7844 >4 <td>Boron</td> <td>ppm</td> <td>ASTM D5185m</td> <td>0</td> <th>12</th> <td>13</td> <td>33</td>	Boron	ppm	ASTM D5185m	0	12	13	33
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 642 738 853 Calcium ppm ASTM D5185m 1070 748 1217 1036 Phosphorus ppm ASTM D5185m 1150 831 932 924 Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 225 3 9 7 Sodium ppm ASTM D5185m 20 <1 2 53 Fuel % ASTM D5185m >20 <1 2 53 Fuel % ASTM D5185m >20 <1 2 53 Fuel % ASTM D5185m 2	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 642 738 853 Calcium ppm ASTM D5185m 1070 748 1217 1036 Phosphorus ppm ASTM D5185m 1150 831 932 924 Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m >20 <1	Molybdenum	ppm	ASTM D5185m	60	49	81	88
Calcium ppm ASTM D5185m 1070 748 1217 1036 Phosphorus ppm ASTM D5185m 1150 831 932 924 Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m >20 <1	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 831 932 924 Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m >20 <1	Magnesium	ppm	ASTM D5185m	1010	642	738	853
Zinc ppm ASTM D5185m 1270 1001 1148 1124 Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m >20 1 13 △ 201 Potassium ppm ASTM D5185m >20 <1	Calcium	ppm	ASTM D5185m	1070	748	1217	1036
Sulfur ppm ASTM D5185m 2060 2648 2954 3520 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m 1 13 △ 201 Potassium ppm ASTM D5185m >20 <1	Phosphorus	ppm	ASTM D5185m	1150	831	932	924
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m 1 13 △ 201 Potassium ppm ASTM D5185m >20 <1	Zinc	ppm	ASTM D5185m	1270	1001	1148	1124
Silicon ppm ASTM D5185m >25 3 9 7 Sodium ppm ASTM D5185m 1 13 △ 201 Potassium ppm ASTM D5185m >20 <1 2 △ 53 Fuel % ASTM D3524 >3.0 <1.0 2.8 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0 0.2 0.1 Nitration Abs/cm *ASTM D7624 >20 3.8 8.2 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 18.9 15.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9	Sulfur	ppm	ASTM D5185m	2060	2648	2954	3520
Sodium ppm ASTM D5185m 1 13 △ 201 Potassium ppm ASTM D5185m >20 <1	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 <1 2 53 Fuel % ASTM D3524 >3.0 <1.0 2.8 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0 0.2 0.1 Nitration Abs/cm *ASTM D7624 >20 3.8 8.2 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 18.9 15.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9	Silicon	ppm	ASTM D5185m	>25	3	9	7
Fuel % ASTM D3524 >3.0 <1.0 2.8 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0 0.2 0.1 Nitration Abs/cm *ASTM D7624 >20 3.8 8.2 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 18.9 15.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9	Sodium	ppm	ASTM D5185m		1	13	<u>^</u> 201
INFRA-RED	Potassium	ppm	ASTM D5185m	>20	<1	2	△ 53
Soot % % *ASTM D7844 >4 0 0.2 0.1 Nitration Abs/cm *ASTM D7624 >20 3.8 8.2 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 18.9 15.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9	Fuel	%	ASTM D3524	>3.0	<1.0	2.8	<1.0
Nitration Abs/cm *ASTM D7624 >20 3.8 8.2 5.6 Sulfation Abs/.1mm *ASTM D7415 >30 14.9 18.9 15.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 14.9 18.9 15.5 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9		%	*ASTM D7844	>4	0	0.2	0.1
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9	Soot %	70					F 0
Oxidation Abs/.1mm *ASTM D7414 >25 9.8 14.2 10.9			*ASTM D7624	>20	3.8	8.2	5.6
	Soot % Nitration Sulfation	Abs/cm					
Base Number (BN) mg KOH/g ASTM D2896 9.8 6.1 6.1 9.6	Nitration Sulfation	Abs/cm Abs/.1mm	*ASTM D7415	>30	14.9	18.9	15.5
	Nitration Sulfation FLUID DEGRAI	Abs/cm Abs/.1mm	*ASTM D7415 method	>30 limit/base	14.9 current	18.9 history1	15.5 history2



OIL ANALYSIS REPORT



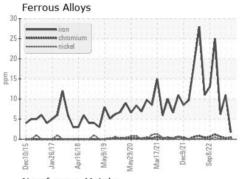


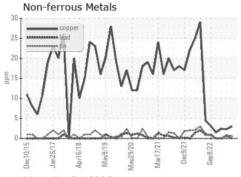


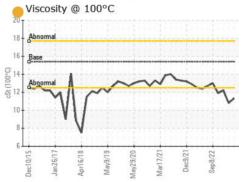
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

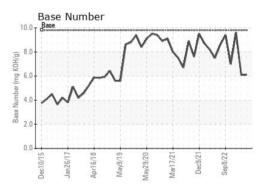
FLUID PROPI	ERTIES					
Visc @ 100°C	cSt	ASTM D445	15.4	11.3	10.8	12.2

GRAPHS











Laboratory Sample No. Lab Number : 06104027 Unique Number : 10902257

: GFL0099752

To discuss this sample report, contact Customer Service at 1-800-237-1369.

Received **Tested** Diagnosed

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : 29 Feb 2024

: 04 Mar 2024

: 04 Mar 2024 - Jonathan Hester Test Package: FLEET (Additional Tests: FuelDilution, PercentFuel)

GFL Environmental - 102 - Morristown TN 415 Ryder Lane, PO Box 1894 Morristown, TN US 37813

Contact: Ricky Dunlap ricky.dunlap@gflenv.com T: (800)207-6618

* - 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)