

OIL ANALYSIS REPORT

Sample Rating Trend

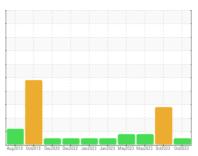
NORMAL



729054-361497

Component **Diesel Engine**

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





DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Metal levels are typical for a new component breaking in.

Contamination

Light fuel dilution occurring. No other contaminants were detected in the oil.

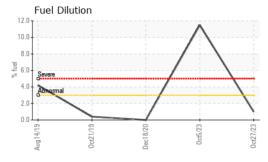
Fluid Condition

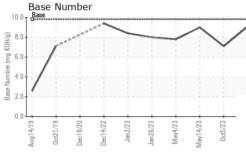
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

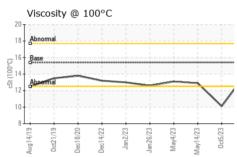
	JN SHP 15W4U (GAL) **Mag2019 Dec2019 Dec2022 Jan2023 Jan2023 Mag2023 Mag2023 Dec2023 Dec2023 **Mag2019 Dec2029 Dec2023 Jan2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 **Mag2019 Dec2029 Dec2029 Jan2023 Jan2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 **Mag2019 Dec2029 Dec2029 Jan2023 Jan2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 Dec2023 Mag2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 Dec2023 Dec2023 Mag2023 Mag2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 Dec2023 Dec2023 Mag2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 Dec2023 Dec2023 Mag2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec2023 Dec2023 Dec2023 Dec2023 Mag2023 Mag2023 Mag2023 Dec2023 Dec						
Sample Date Client Info 27 Oct 2023 05 Oct 2023 14 May 2023 Machine Age hrs Client Info 150 5540 5531 Oil Age hrs Client Info 150 150 600 Oil Changed Client Info Not Changd Not Changed Changed Changed Sample Status Nethod	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 150 5540 5531 Oil Age hrs Client Info 150 150 600 600 Oil Changed Client Info Not Changd Not Changed Changed Changed Sample Status Description Not Changd Not Changd ABNORMAL CONTAMINATION method Imitition NEG NEG NEG WEAR METALS method Imitition NEG NEG NEG WEAR METALS method Imititions current history1 history2 Iron ppm ASTM D5185m >120 6 25 8 Chromium ppm ASTM D5185m >20 <1	Sample Number		Client Info		GFL0065494	GFL0090154	GFL0076826
Oil Age hrs Client Info 150 150 600 Oil Changed Sample Status Client Info Not Changd Not Changd Changed Sample Status Changed Changed Severe ABNORMAL CONTAMINATION 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 6 25 8 Chromium ppm ASTM D5185m >20 <1	Sample Date		Client Info		27 Oct 2023	05 Oct 2023	14 May 2023
Cilient Info Not Changd Not Changd Severe ABNORMAL	Machine Age	hrs	Client Info		150	5540	5531
CONTAMINATION	Oil Age	hrs	Client Info		150	150	600
CONTAMINATION	Oil Changed		Client Info		Not Changd	Not Changd	Changed
WEAR METALS	Sample Status				NORMAL	SEVERE	ABNORMAL
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 6 25 8 Chromium ppm ASTM D5185m >20 -1 -1 0 Nickel ppm ASTM D5185m >20 -1 0 0 Titanium ppm ASTM D5185m >2 2 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >40 0 -1 0 Lead ppm ASTM D5185m >40 0 -1 0 Copper ppm ASTM D5185m >15 <1 <1 0 0 Vanadium ppm ASTM D5185m >15 <1 <1 0 0 Cadmium ppm ASTM D5185m 0	CONTAMINAT	ION	method	limit/base	current	history1	history2
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 <1 <1 0 Nickel ppm ASTM D5185m >5 <1 0 0 Titanium ppm ASTM D5185m >2 2 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >40 0 <1 0 Copper ppm ASTM D5185m >40 0 <1 0 Copper ppm ASTM D5185m >41 0 0 Vanadium ppm ASTM D5185m <1 0 0 Cadium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 8 <1 Barium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>120	6	25	8
Titanium ppm ASTM D5185m >2 2 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 6 5 ▲ 26 Lead ppm ASTM D5185m >330 <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 6 5 ▲ 26 Lead ppm ASTM D5185m >40 0 <1 0 Copper ppm ASTM D5185m >330 <1 2 <1 Tin ppm ASTM D5185m >15 <1 <1 0 0 Vanadium ppm ASTM D5185m >15 <1 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 8 <1 Boron ppm ASTM D5185m 0 <1 0 0 Boron ppm ASTM D5185m 0 58 51 57 Manganesium ppm ASTM D5185m <	Nickel	ppm	ASTM D5185m	>5	<1	0	0
Aluminum ppm ASTM D5185m >20 6 5 ▲ 26 Lead ppm ASTM D5185m >40 0 <1	Titanium	ppm	ASTM D5185m	>2	2	0	0
Lead ppm ASTM D5185m >40 0 <1 0 Copper ppm ASTM D5185m >330 <1 2 <1 Tin ppm ASTM D5185m >15 <1 <1 0 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m 0 1 8 <1 Barium ppm ASTM D5185m 0 <1 0 0 Barium ppm ASTM D5185m 0 <1 0 0 Molybdenum ppm ASTM D5185m 0 <1 0 0 Manganese ppm ASTM D5185m 0 0 <1 <1 <1 Manganesium ppm ASTM D5185m 1010 907 802 919 Calcium ppm ASTM D5185m 120 999 884 986	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 <1 2 <1 Tin ppm ASTM D5185m >15 <1	Aluminum	ppm	ASTM D5185m	>20	6	5	<u>^</u> 26
Tin ppm ASTM D5185m >15 <1 <1 0 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 8 <1	Lead	ppm	ASTM D5185m	>40	0	<1	0
Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 8 <1 Barium ppm ASTM D5185m 0 <1 0 0 Molybdenum ppm ASTM D5185m 0 0 <1 <1 <1 Manganese ppm ASTM D5185m 0 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 907 802 919 Calcium ppm ASTM D5185m 1070 1003 875 1041 Phosphorus ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base curr	Copper	ppm	ASTM D5185m	>330	<1	2	<1
Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 8 <1	Tin	ppm	ASTM D5185m	>15	<1	<1	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 1 8 <1	Vanadium	ppm	ASTM D5185m		<1	0	0
Boron ppm ASTM D5185m 0 1 8 <1 Barium ppm ASTM D5185m 0 <1 0 Molybdenum ppm ASTM D5185m 60 58 51 57 Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 907 802 919 Calcium ppm ASTM D5185m 1070 1003 875 1041 Phosphorus ppm ASTM D5185m 1150 999 884 986 Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 2 2 7 <1 Fuel % ASTM D5185m >20 1.0 ●11.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.1 0.8 0.1 Nitration Abs/:mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/:mm *ASTM D7414 >25 13.7 14.9 14.0	Cadmium	ppm	ASTM D5185m		<1	0	0
Barium ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 58 51 57 Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 907 802 919 Calcium ppm ASTM D5185m 1070 1003 875 1041 Phosphorus ppm ASTM D5185m 1150 999 884 986 Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m >20 2 7 <1 Fuel % ASTM D5185m >20 2 7 <1 Fuel % ASTM D7844	Boron	ppm	ASTM D5185m	0	1	8	<1
Manganese ppm ASTM D5185m 0 0 <1 <1 Magnesium ppm ASTM D5185m 1010 907 802 919 Calcium ppm ASTM D5185m 1070 1003 875 1041 Phosphorus ppm ASTM D5185m 1150 999 884 986 Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m >20 2 7 <1 Fuel % ASTM D5185m >20 2 7 <1 Fuel % ASTM D5185m >20 2 7 <1 INFRA-RED method limit/base current	Barium	ppm	ASTM D5185m	0	<1	0	0
Magnesium ppm ASTM D5185m 1010 907 802 919 Calcium ppm ASTM D5185m 1070 1003 875 1041 Phosphorus ppm ASTM D5185m 1150 999 884 986 Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m >20 2 7 <1	Molybdenum	ppm	ASTM D5185m	60	58	51	57
Calcium ppm ASTM D5185m 1070 1003 875 1041 Phosphorus ppm ASTM D5185m 1150 999 884 986 Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m 12 36 15 Potassium ppm ASTM D5185m >20 2 7 <1	Manganese	ppm	ASTM D5185m	0	0	<1	<1
Phosphorus ppm ASTM D5185m 1150 999 884 986 Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m >20 2 7 <1	Magnesium	ppm		1010	907	802	919
Zinc ppm ASTM D5185m 1270 1231 1063 1199 Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m >20 2 7 <1	Calcium	ppm	ASTM D5185m	1070	1003	875	1041
Sulfur ppm ASTM D5185m 2060 3717 2837 3338 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m 12 36 15 Potassium ppm ASTM D5185m >20 2 7 <1	Phosphorus	ppm	ASTM D5185m	1150	999	884	986
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m 12 36 15 Potassium ppm ASTM D5185m >20 2 7 <1	Zinc	ppm	ASTM D5185m	1270	1231	1063	1199
Silicon ppm ASTM D5185m >25 4 9 5 Sodium ppm ASTM D5185m 12 36 15 Potassium ppm ASTM D5185m >20 2 7 <1 Fuel % ASTM D3524 >3.0 1.0 11.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.1 0.8 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9 7.4 6.0 Sulfation Abs/.1mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Sulfur	ppm	ASTM D5185m	2060	3717	2837	3338
Sodium ppm ASTM D5185m 12 36 15 Potassium ppm ASTM D5185m >20 2 7 <1	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 2 7 <1 Fuel % ASTM D3524 >3.0 1.0 11.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.1 0.8 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9 7.4 6.0 Sulfation Abs/.1mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Silicon	ppm	ASTM D5185m	>25	4	9	5
Fuel % ASTM D3524 >3.0 1.0 ● 11.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.1 0.8 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9 7.4 6.0 Sulfation Abs/.1mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Sodium	ppm	ASTM D5185m		12	36	15
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.1 0.8 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9 7.4 6.0 Sulfation Abs/.1mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Potassium	ppm	ASTM D5185m	>20	2	7	<1
Soot % % *ASTM D7844 >4 0.1 0.8 0.1 Nitration Abs/cm *ASTM D7624 >20 4.9 7.4 6.0 Sulfation Abs/.1mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Fuel	%	ASTM D3524	>3.0	1.0	11.5	<1.0
Nitration Abs/cm *ASTM D7624 > 20 4.9 7.4 6.0 Sulfation Abs/.1mm *ASTM D7415 > 30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 > 25 13.7 14.9 14.0	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 17.5 19.4 18.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Soot %	%	*ASTM D7844	>4	0.1	0.8	0.1
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Nitration	Abs/cm	*ASTM D7624	>20	4.9	7.4	6.0
Oxidation Abs/.1mm *ASTM D7414 >25 13.7 14.9 14.0	Sulfation	Abs/.1mm	*ASTM D7415	>30	17.5	19.4	18.0
	FLUID DEGRAD	OATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 9.1 7.1 9.0	Out desired	A la a / d ususa	*A CTM D7444	0.5		110	110
	Oxidation	ADS/.1mm	ASTNI D/414	>25	13.7	14.9	14.0



OIL ANALYSIS REPORT



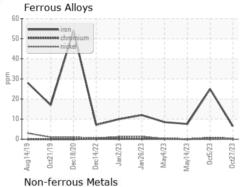


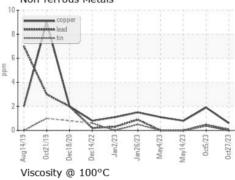


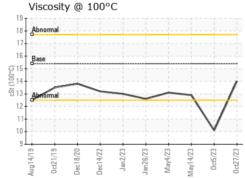
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

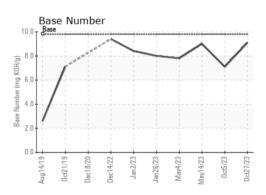
FLUID FROF		memod			HISTORY	HISTORYZ
Visc @ 100°C	cSt	ASTM D445	15.4	14.0	10.1	12.9

GRAPHS













Laboratory Sample No. Lab Number Unique Number : 10723746

: GFL0065494 : 05995386

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 01 Nov 2023 Diagnosed : 03 Nov 2023

Diagnostician : Wes Davis

Test Package : FLEET (Additional Tests: PercentFuel) To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

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

GFL Environmental - 829 - Wilco Hauling

5054 Highway HH Hartville, MO US 65667

Contact: James Jones james.jones@gflenv.com T: (417)349-5006