

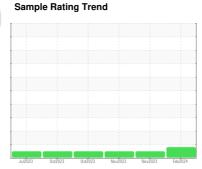
OIL ANALYSIS REPORT



(BD33472) 913063

Diesel Engine

PETRO CANADA DURON SHP 15W40 (33 QTS)





DIAGNOSIS

Recommendation

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

Exhaust valve wear is indicated.

Contamination

There is no indication of any contamination in the

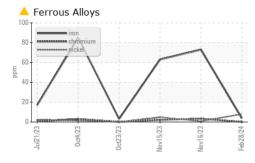
Fluid Condition

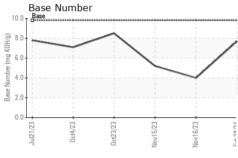
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

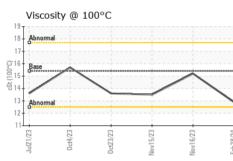
Sample Date	N SHP 15W40 (3	3 Q (S)	Jul2023	0et2023 0et2023	Nov2023 Nov2023	Feb 2024	
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 16572 17268 17006 Dil Age hrs Client Info 600 17268 11556 Dil Changed Client Info Not Changd Changed N/A Sample Status MC Method Sample Status	Sample Number		Client Info		GFL0104347	GFL0059281	GFL0059267
Dil Age	Sample Date		Client Info		28 Feb 2024	16 Nov 2023	15 Nov 2023
Contained Client Info Remorable Changed Changed Changed Changed Changed Changed Contained Co	Machine Age	hrs	Client Info		16572	17268	17006
CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		600	17268	11556
CONTAMINATION	Oil Changed		Client Info		Not Changd	Changed	N/A
Water	Sample Status				ABNORMAL	NORMAL	NORMAL
Water Glycol WC Method WC Method >0.2 NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 4 73 63 Chromium ppm ASTM D5185m >20 0 3 2 Nickel ppm ASTM D5185m >2 0 4 73 63 Silver ppm ASTM D5185m >2 0 3 2 1	CONTAMINAT	ION	method	limit/base	current	history1	history2
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 ron ppm ASTM D5185m >120 4 73 63 Chromium ppm ASTM D5185m >20 0 3 2 Nickel ppm ASTM D5185m >5 ▲ 8 <1	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG
Post	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Strickel	ron	ppm	ASTM D5185m	>120	4	73	63
Distribution	Chromium	ppm	ASTM D5185m	>20	0	3	2
Silver	Nickel	ppm	ASTM D5185m	>5	<u>^</u> 8	<1	5
Aluminum	Titanium	ppm	ASTM D5185m	>2	0	<1	<1
Aluminum	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper	Aluminum	ppm	ASTM D5185m	>20	<1	6	2
Proceedings Proceedings Processing P	Lead	ppm	ASTM D5185m	>40	0	<1	<1
Princ	Copper	ppm	ASTM D5185m	>330	26	3	14
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 0 12 2 <1 Barium ppm ASTM D5185m 0 2 0 0 Molybdenum ppm ASTM D5185m 60 49 65 59 Manganese ppm ASTM D5185m 0 0 <1 1 Magnesium ppm ASTM D5185m 1010 837 1063 878 Calcium ppm ASTM D5185m 1070 976 1177 1033 Phosphorus ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current <th< td=""><td></td><td>ppm</td><td>ASTM D5185m</td><td>>15</td><td>0</td><td>0</td><td>2</td></th<>		ppm	ASTM D5185m	>15	0	0	2
ADDITIVES	Vanadium	ppm	ASTM D5185m		0	0	<1
Soron ppm ASTM D5185m 0 12 2 2 2 2 3	Cadmium	ppm	ASTM D5185m		0	0	0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 49 65 59 Manganese ppm ASTM D5185m 0 0 <1 1 Magnesium ppm ASTM D5185m 1010 837 1063 878 Calcium ppm ASTM D5185m 1070 976 1177 1033 Phosphorus ppm ASTM D5185m 1150 933 1065 905 Zinc ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 >4 <	Boron	ppm	ASTM D5185m	0	12	2	<1
Manganese ppm ASTM D5185m 0 0 <1 1 Magnesium ppm ASTM D5185m 1010 837 1063 878 Calcium ppm ASTM D5185m 1070 976 1177 1033 Phosphorus ppm ASTM D5185m 1150 933 1065 905 Zinc ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624	Barium	ppm	ASTM D5185m	0	2	0	0
Magnesium ppm ASTM D5185m 1010 837 1063 878 Calcium ppm ASTM D5185m 1070 976 1177 1033 Phosphorus ppm ASTM D5185m 1150 933 1065 905 Zinc ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method	Molybdenum	ppm	ASTM D5185m	60	49	65	59
Calcium ppm ASTM D5185m 1070 976 1177 1033 Phosphorus ppm ASTM D5185m 1150 933 1065 905 Zinc ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm	Manganese	ppm	ASTM D5185m	0	0	<1	1
Phosphorus ppm ASTM D5185m 1150 933 1065 905 Zinc ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm	Magnesium	ppm	ASTM D5185m	1010	837	1063	878
Zinc ppm ASTM D5185m 1270 1066 1347 1200 Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m 8 11 7 Potassium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414	Calcium	ppm	ASTM D5185m	1070	976	1177	1033
Sulfur ppm ASTM D5185m 2060 2501 2626 1804 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m 8 11 7 Potassium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Phosphorus	ppm	ASTM D5185m	1150	933	1065	905
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m 8 11 7 Potassium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Zinc	ppm	ASTM D5185m	1270	1066	1347	1200
Silicon ppm ASTM D5185m >25 3 15 6 Sodium ppm ASTM D5185m 8 11 7 Potassium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Sulfur	ppm	ASTM D5185m	2060	2501	2626	1804
Sodium ppm ASTM D5185m 8 11 7 Potassium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 3 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Silicon	ppm	ASTM D5185m	>25	3	15	6
INFRA-RED	Sodium	ppm	ASTM D5185m		8	11	7
Soot % % *ASTM D7844 >4 0.2 1.3 1.3 Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Potassium	ppm	ASTM D5185m	>20	0	3	2
Nitration Abs/cm *ASTM D7624 >20 5.9 15.9 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Soot %	%	*ASTM D7844	>4	0.2	1.3	1.3
Sulfation Abs/.1mm *ASTM D7415 >30 19.6 30.0 23.7 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 15.9 32.1 21.5	Vitration	Abs/cm	*ASTM D7624	>20	5.9	15.9	10.9
Oxidation							
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	15.9	32.1	21.5
	Base Number (BN)	mg KOH/g			7.7	4.0	5.2



OIL ANALYSIS REPORT



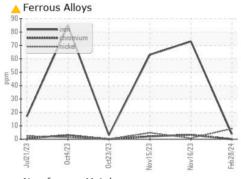


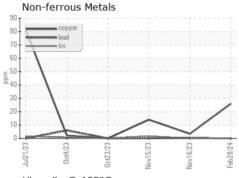


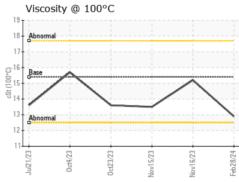
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

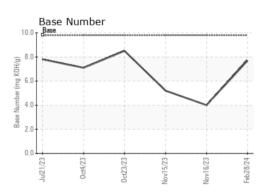
FLUID PROPI	EKIIE2	method	ilmit/base	current	nistory i	nistory2
Visc @ 100°C	cSt	ASTM D445	15.4	12.9	15.2	13.5

GRAPHS













Laboratory Sample No. Unique Number : 10912720

Test Package : FLEET

: GFL0104347 Lab Number : 06109223

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

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

Tested Diagnosed

: 05 Mar 2024 : 06 Mar 2024 : 07 Mar 2024 - Sean Felton

GFL Environmental - 410 - Michigan West 39000 Van Born Rd Wayne, MI

US 48184 Contact: Belal Dgheish bdgheish@gflenv.com

T: (734)714-2340

* - 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)