

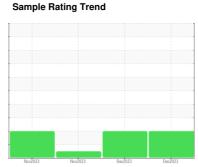
OIL ANALYSIS REPORT



Machine Id 814040 Component

Diesel Engine

PETRO CANADA DURON SHP 15W40 (30 LTR)





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

Elemental level of silicon (Si) above normal indicating ingress of seal material.

▲ 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 INFORMATION method limit/base current history1 history2	N SHP 15W40 (3	0 LTR)	Nov202	3 Nov2023	Dec2023 D	ec2023	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		GFL0105777	GFL0105617	GFL0089129
Dil Age	Sample Date		Client Info		18 Dec 2023	12 Dec 2023	24 Nov 2023
Client Info	Machine Age	hrs	Client Info		581	4691	377
ABNORMAL ABNORMAL	Oil Age	hrs	Client Info		0	0	377
Mater	Oil Changed		Client Info		Changed	Not Changd	Changed
Water WC Method >0.2 NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 31 27 20 Chromium ppm ASTM D5185m >20 <1	Sample Status				ABNORMAL	ABNORMAL	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 ron ppm ASTM D5185m >120 31 27 20 Chromium ppm ASTM D5185m >20 <1	Nater		WC Method	>0.2	NEG	NEG	NEG
Pop	Glycol		WC Method		NEG	NEG	NEG
Description	WEAR METAL	.S	method	limit/base	current	history1	history2
Silver	ron	ppm	ASTM D5185m	>120	31	27	20
Silver	Chromium	ppm	ASTM D5185m	>20	<1	1	1
Silver	Nickel	ppm	ASTM D5185m	>5	1	1	1
Aluminum ppm ASTM D5185m >20 3 4 6 6 Lead ppm ASTM D5185m >40 0 2 <1 Copper ppm ASTM D5185m >330 244 140 <1 Copper ppm ASTM D5185m >15 1 <1 <1 <1 Cadmium ppm ASTM D5185m >15 1 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 0 0 0 ASTM D5185m 0 0 0 0 0 0 0 0 Molybdenum ppm ASTM D5185m 0 0 3 2 <1 Magnesium ppm ASTM D5185m 1010 688 729 870 Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1150 644 791 1059 Elinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Solidion ppm ASTM D5185m >25 61 61 42 8 Bodium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D3524 >3.0 <1.0 0.7 <1.0 INFRA-RED method limit/base current history1 history2 Solfation Abs/.1mm *ASTM D7844 >4 0.3 1.2 0.3 Sulfation Abs/.1mm *ASTM D7845 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7844 >25 21.1 19.2 14.6	Γitanium	ppm	ASTM D5185m	>2	<1	<1	0
December December	Silver	ppm	ASTM D5185m	>2	0	0	<1
Description	Aluminum	ppm	ASTM D5185m	>20	3	4	6
Tin	_ead	ppm	ASTM D5185m	>40	0	2	<1
Anadium ppm ASTM D5185m 0 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 240 156 3 Barium ppm ASTM D5185m 0 0 0 0 Manganese ppm ASTM D5185m 0 3 2 <1 Magnesium ppm ASTM D5185m 1010 688 729 870 Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1070 1269 1221 1003 Picinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1	Copper	ppm	ASTM D5185m	>330	244	140	<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 240 156 3 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 60 107 89 52 Magnesium ppm ASTM D5185m 0 3 2 <1 Magnesium ppm ASTM D5185m 1010 688 729 870 Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 4 </td <td>- in</td> <td></td> <td>ASTM D5185m</td> <td>>15</td> <td>1</td> <td><1</td> <td><1</td>	- in		ASTM D5185m	>15	1	<1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 240 156 3 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 3 2 <1	/anadium	ppm	ASTM D5185m		0	<1	<1
Soron ppm ASTM D5185m 0 240 156 3 3 3 3 3 3 3 3 3	Cadmium	ppm	ASTM D5185m		0	0	0
Sarium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 107 89 52 Manganese ppm ASTM D5185m 0 3 2 <1 Magnesium ppm ASTM D5185m 1010 688 729 870 Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1150 644 791 1059 Zinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Godium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D5185m >20 4 2 6 Fuel % ASTM D3524	Boron	ppm	ASTM D5185m	0	240	156	3
Manganese ppm ASTM D5185m 0 3 2 <1 Magnesium ppm ASTM D5185m 1010 688 729 870 Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1150 644 791 1059 Zinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Goldium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D5185m >20 4 2 6 Fuel % ASTM D5185m >20 4 2 6 Fuel % ASTM D5185m >20	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium ppm ASTM D5185m 1010 688 729 870 Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1150 644 791 1059 Zinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Sodium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D5185m >20 4 2 6 Fuel % ASTM D3524 >3.0 <1.0	Molybdenum	ppm	ASTM D5185m	60	107	89	52
Calcium ppm ASTM D5185m 1070 1269 1221 1003 Phosphorus ppm ASTM D5185m 1150 644 791 1059 Zinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Sodium ppm ASTM D5185m >20 4 42 8 Fuel % ASTM D3524 >3.0 <1.0 0.7 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.3 1.2 0.3 Vitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/cm	Manganese	ppm	ASTM D5185m	0	3	2	<1
Phosphorus ppm ASTM D5185m 1150 644 791 1059 Zinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Sodium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D7844 >4 0.3 1	Magnesium	ppm	ASTM D5185m	1010	688	729	870
Zinc ppm ASTM D5185m 1270 854 984 1207 Sulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Sodium ppm ASTM D5185m 0 4 4 Potassium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D3524 >3.0 <1.0 0.7 <1.0 INFRA-RED method limit/base current history1 his	Calcium	ppm	ASTM D5185m	1070	1269	1221	1003
Gulfur ppm ASTM D5185m 2060 2275 1969 3041 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Sodium ppm ASTM D5185m 0 4 4 Potassium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D5185m >20 <1.0 0.7 <1.0 INFRA-RED method limit/base current history1 history2 Goot % % *ASTM D7624 >20 8.9 9.3 7.0	Phosphorus	ppm	ASTM D5185m	1150	644	791	1059
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 61 42 8 Sodium ppm ASTM D5185m 0 4 4 Potassium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D3524 >3.0 <1.0	Zinc	ppm	ASTM D5185m	1270	854	984	1207
Solition ppm ASTM D5185m >25	Sulfur	ppm	ASTM D5185m	2060	2275	1969	3041
Sodium ppm ASTM D5185m 0 4 4 Potassium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D3524 >3.0 <1.0	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 4 2 6 Fuel % ASTM D3524 >3.0 <1.0 0.7 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.3 1.2 0.3 Vitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	Silicon	ppm	ASTM D5185m	>25	<u> </u>	4 2	8
Fuel % ASTM D3524 >3.0 <1.0 0.7 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.3 1.2 0.3 Nitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	Sodium	ppm	ASTM D5185m		0	4	4
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 0.3 1.2 0.3 Nitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	Potassium	ppm	ASTM D5185m	>20	4	2	6
Soot % % *ASTM D7844 >4 0.3 1.2 0.3 Nitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	uel	%	ASTM D3524	>3.0	<1.0	0.7	<1.0
Nitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm *ASTM D7624 >20 8.9 9.3 7.0 Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	Soot %	%	*ASTM D7844	>4	0.3	1.2	0.3
Sulfation Abs/.1mm *ASTM D7415 >30 23.9 24.1 18.8 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	Nitration	Abs/cm	*ASTM D7624	>20		9.3	7.0
Dxidation Abs/.1mm *ASTM D7414 >25 21.1 19.2 14.6	Sulfation						
	FLUID DEGRAI	NOITAC	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	21.1	19.2	14.6
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.0	9.1	8.7



OIL ANALYSIS REPORT







Laboratory Sample No. Lab Number **Unique Number**

: GFL0105777 : 06040218

: 10795447

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Recieved : 20 Dec 2023 Diagnosed : 22 Dec 2023

Diagnostician : Jonathan Hester **Test Package**: FLEET (Additional Tests: FuelDilution, 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 - 415 - Michigan East

6200 Elmridge Sterling Heights, MI US 48313 Contact: Frank Wolak fwolak@gflenv.com T: (586)825-9514