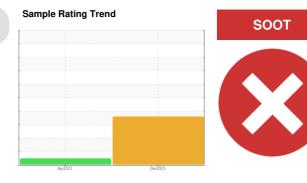


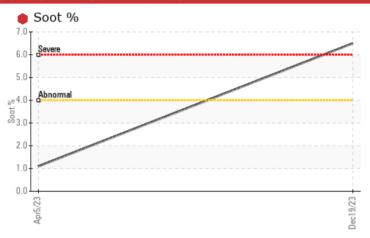
PROBLEM SUMMARY

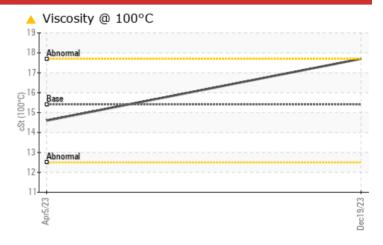


PETRO CANADA DURON SHP 15W40 (--- GAL)









RECOMMENDATION

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. The oil change at the time of sampling has been noted. We recommend you service the filters on this component. We recommend an early resample to monitor this condition. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.

PROBLEMATIC TEST RESULTS									
Sample Status				SEVERE	NORMAL				
Soot %	%	*ASTM D7844	>4	6.5	1.1				
Base Number (BN)	mg KOH/g	ASTM D2896	9.8	△ 0.0	8.2				
Visc @ 100°C	cSt	ASTM D445	15.4	17.7	14.6				

Customer Id: GFL932 **Sample No.:** GFL0080363 Lab Number: 06068239 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Jonathan Hester +1 919-379-4092 x4092 ihester@wearcheckusa.com

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com

RECOMMENDE	RECOMMENDED ACTIONS				
Action	Status	Date	Done By	Description	
Change Filter			?	We recommend you service the filters on this component.	
Resample			?	We recommend an early resample to monitor this condition.	
Alert			?	NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.	
Check Combustion			?	We advise that you check for faulty combustion, plugged air filters, or aftercoolers.	

HISTORICAL DIAGNOSIS

05 Apr 2023 Diag: Wes Davis

NORMAL

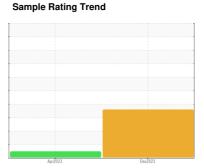


Resample at the next service interval to monitor. Metal levels are typical for a new component breaking in. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.





OIL ANALYSIS REPORT







927027 Component **Diesel Engine**

PETRO CANADA DURO

DIAGNOSIS

Recommendation

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. The oil change at the time of sampling has been noted. We recommend you service the filters on this component. We recommend an early resample to monitor this condition. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.

Wear

All component wear rates are normal.

Contamination

There is an abnormal amount of solids and carbon present in the oil.

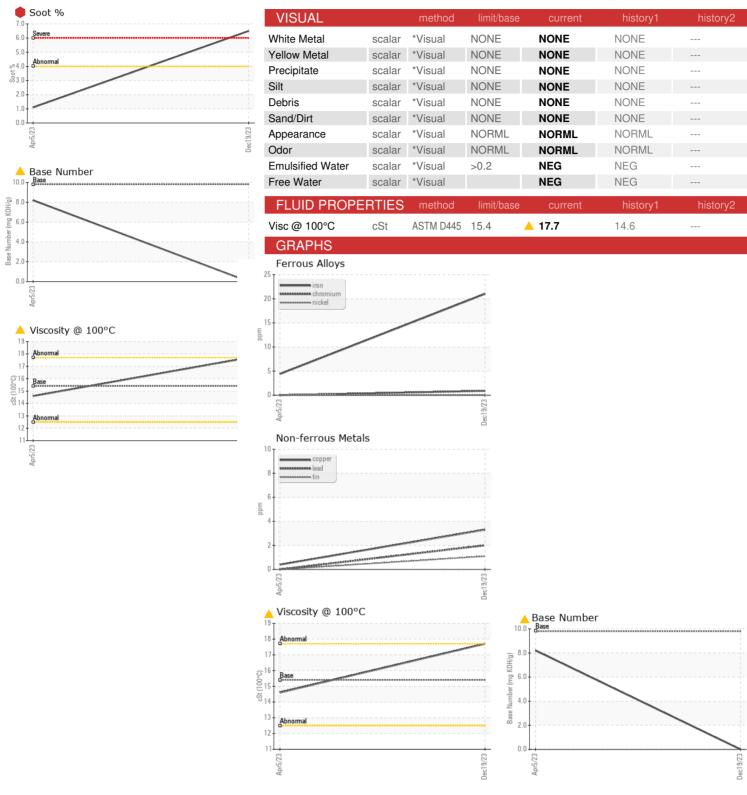
Fluid Condition

The oil viscosity is higher than normal. The BN level is low.

SAMPLE INFORMATION method Imit/base current history1 history2	N SHP 15W40 (-	GAL)		Apr2023	Dec2023		
Sample Number Client Info GFL0080363 GFL0078795	SAMPLE INFOR	MATION	method			history1	history2
Sample Date					GFL0080363		
Machine Age hrs Client Info Dil Age hrs Client Info Sample Status CONTAMINATION method limit/base current history1 history2 Water WC Method NEG NEG WEAR METALS method limit/base current history1 history2 Inon ppm ASTM D5185m >2 0 0 0 Chromium ppm ASTM D5185m >2 0 0 0 Vickel ppm ASTM D5185m >2 0 0 0 Rickel ppm ASTM D5185m >4 0 2 0 0 Rickel ppm ASTM D5185m >4 0 2 0 0 Rickel ppm ASTM D5185m >4 0 2 0 0 Rickel ppm ASTM D5185m >4 0 0 0 Rickel ppm ASTM D5185m >4 1 0 0 Rickel ppm ASTM D5185m >4 1 0 0 Rickel ppm ASTM D5185m >4 1 0 0 Rickel ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Manganese ppm ASTM D5185m 10 10 1056 929 Rickel ppm ASTM D5185m >2 0 0 0 1 1 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2 0 0 0 0 Rickel ppm ASTM D5185m >2							
Dil Age	•	hrs					
Contamped Client Info Severe Normal Changed Changed Changed Changed Changed Changed Changed Changed Severe Normal Contamboration Contamboration Contamboration Contamboration Changed Changed Changed Changed Contamboration Changed Changed							
Water	Oil Changed		Client Info		Changed	Changed	
Water	Sample Status					Ü	
WEAR METALS	CONTAMINAT	TON	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >120 21 4	Water		WC Method	>0.2	NEG	NEG	
Chromium	Glycol		WC Method		NEG	NEG	
Description	WEAR METAL	_S	method	limit/base	current	history1	history2
ASTM D5185m S	ron	ppm	ASTM D5185m	>120	21	4	
Description	Chromium	ppm	ASTM D5185m	>20	<1	0	
Saliver	Nickel	ppm	ASTM D5185m	>5	0	0	
Aluminum	Γitanium	ppm	ASTM D5185m	>2	<1	0	
December December	Silver	ppm	ASTM D5185m	>2	0	0	
Copper	Aluminum	ppm	ASTM D5185m	>20	2	<1	
Tin ppm ASTM D5185m > 15 1 0	Lead	ppm	ASTM D5185m	>40	2	0	
Tin	Copper		ASTM D5185m	>330	3	<1	
Academium	Γin		ASTM D5185m	>15	1	0	
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 <1	/anadium		ASTM D5185m		<1	0	
Soron ppm ASTM D5185m 0 0 1						0	
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 63 58 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	<1	<1	
Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 1010 1056 929 Calcium ppm ASTM D5185m 1070 1125 999 Phosphorus ppm ASTM D5185m 1150 1121 971 Zinc ppm ASTM D5185m 1270 1338 1194 Sulfur ppm ASTM D5185m 2060 3285 3243 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 2 Sodium ppm ASTM D5185m >20 0 0 Fuel % ASTM D5185m >20 0 0 Fuel % ASTM D5185m >20 0 0 Fuel % ASTM D5185m >20			ACTA DE LOS	0		4	
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Phosphorus ppm ASTM D5185m 1150 1121 971 Zinc ppm ASTM D5185m 1270 1338 1194 Sulfur ppm ASTM D5185m 2060 3285 3243 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 2 Sodium ppm ASTM D5185m 3 <1	Molybdenum	ppm	ASTM D5185m	60	63	58	
Phosphorus ppm ASTM D5185m 1150 1121 971 Zinc ppm ASTM D5185m 1270 1338 1194 Sulfur ppm ASTM D5185m 2060 3285 3243 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 2 Sodium ppm ASTM D5185m >20 0 0 Potassium ppm ASTM D5185m >20 0 0 Fuel % ASTM D3524 >3.0 <1.0	Molybdenum Manganese	ppm	ASTM D5185m ASTM D5185m	60	63 <1	58 <1	
Zinc ppm ASTM D5185m 1270 1338 1194 Sulfur ppm ASTM D5185m 2060 3285 3243 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 2 Sodium ppm ASTM D5185m 3 <1	Molybdenum Manganese Magnesium	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010	63 <1 1056	58 <1 929	
Sulfur ppm ASTM D5185m 2060 3285 3243 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 5 2 Sodium ppm ASTM D5185m 3 <1	Molybdenum Manganese Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070	63 <1 1056 1125	58 <1 929 999	
Solition ppm ASTM D5185m >25 5 2	Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150	63 <1 1056 1125 1121	58 <1 929 999 971	
Sodium	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270	63 <1 1056 1125 1121 1338	58 <1 929 999 971 1194	
Sodium	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060	63 <1 1056 1125 1121 1338 3285	58 <1 929 999 971 1194 3243	
Potassium ppm ASTM D5185m >20 0 0 Fuel % ASTM D3524 >3.0 <1.0 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >4 6.5 1.1 Nitration Abs/cm *ASTM D7624 >20 14.3 5.1 Sulfation Abs/.1mm *ASTM D7415 >30 31.1 17.4 FLUID DEGRADATION method limit/base current history1 history2 Dxidation Abs/.1mm *ASTM D7414 >25 20.8 12.3	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	60 0 1010 1070 1150 1270 2060	63 <1 1056 1125 1121 1338 3285 current	58 <1 929 999 971 1194 3243 history1	 history2
NFRA-RED	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	60 0 1010 1070 1150 1270 2060	63 <1 1056 1125 1121 1338 3285 current	58 <1 929 999 971 1194 3243 history1	 history2
Soot %	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm	ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base	63 <1 1056 1125 1121 1338 3285 current 5	58 <1 929 999 971 1194 3243 history1 2 <1	 history2
Nitration Abs/cm *ASTM D7624 >20 14.3 5.1 Sulfation Abs/.1mm *ASTM D7415 >30 31.1 17.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.8 12.3	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm	ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >25	63 <1 1056 1125 1121 1338 3285 current 5 3 0	58 <1 929 999 971 1194 3243 history1 2 <1 0	history2
Nitration Abs/cm *ASTM D7624 >20 14.3 5.1 Sulfation Abs/.1mm *ASTM D7415 >30 31.1 17.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.8 12.3	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm	ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	63 <1 1056 1125 1121 1338 3285 current 5 3 0 <1.0	58 <1 929 999 971 1194 3243 history1 2 <1 0 <1.0	
Sulfation Abs/.1mm *ASTM D7415 >30 31.1 17.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.8 12.3	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm	ASTM D5185m ASTM D3524	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0	63 <1 1056 1125 1121 1338 3285 current 5 3 0 <1.0 current	58 <1 929 999 971 1194 3243 history1 2 <1 0 <1.0 history1	
Oxidation	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >4	63 <1 1056 1125 1121 1338 3285 current 5 3 0 <1.0 current	58 <1 929 999 971 1194 3243 history1 2 <1 0 <1.0 history1 1.1	
	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7624	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >4 >20	63 <1 1056 1125 1121 1338 3285 current 5 3 0 <1.0 current 6.5 14.3	58 <1 929 999 971 1194 3243 history1 2 <1 0 <1.0 history1 1.1 5.1	
	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7624	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >4 >20 >30	63 <1 1056 1125 1121 1338 3285 current 5 3 0 <1.0 current 6.5 14.3 31.1	58 <1 929 999 971 1194 3243 history1 2 <1 0 <1.0 history1 1.1 5.1 17.4	history2 history2
	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRA	ppm	ASTM D5185m ASTM D3524 method *ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7844	60 0 1010 1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >4 >20 >30 limit/base	63 <1 1056 1125 1121 1338 3285 current 5 3 0 <1.0 current 6.5 14.3 31.1 current	58 <1 929 999 971 1194 3243 history1 2 <1 0 <1.0 history1 1.1 5.1 17.4 history1	



OIL ANALYSIS REPORT







Laboratory Sample No. Lab Number Unique Number

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : GFL0080363 : 06068239

: 10844916

Recieved : 23 Jan 2024 Diagnosed : 25 Jan 2024 Diagnostician : Jonathan Hester

Test Package : FLEET (Additional Tests: FuelDilution) 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 - 932 - Muskego HC

W144 S6400 College Ct. Muskego, WI US 53150

Contact: Brian Schlomann brian.schlomann@gflenv.com

T: (262)510-4586