

## **OIL ANALYSIS REPORT**

Sample Rating Trend





Machine Id 912017 Component

**Diesel Engine** Fluid

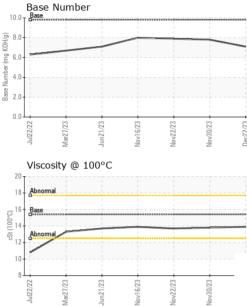
PETRO CANADA DURON SHP 15W40 (--- GAL)

ecommendation Sample Number Client Info GFL0105838 GFL0101473 GFL0089102   esample at the next service interval to monitor. Sample Date Client Info 22 Dec 2023 30 Nov 2023 22 Nov 2023 22 Nov 2023   I component wear rates are normal. Machine Age hrs Client Info 5158 5084 3967   Oil Age hrs Client Info N/A Changed Changed   Oil Changed Client Info N/A Changed Changed   Oil Changed Client Info NORMAL NORMAL NORMAL   VORMAL NORMAL NORMAL NORMAL NORMAL NORMAL		·		Jui2U22	Mar2U23 Jun2U23	Nov2023 Nov2023 Nov2023	Dec2023	
Sample Date   Client Info   22 Dec 2023   30 Nov 2033   22 Nov 2033     Icomponent wear rates are normal.   Oil Age   hrs   Client Info   5158   5684   3657     Icomponent wear rates are normal.   Oil Age   hrs   Client Info   NA   Changed   Ch	DIAGNOSIS	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Part is component wear rates are normal. comtamination normalination the is in indication of any contamination in the i. Site in indication of any contamination in the i. Site in indication of any contamination in the i. NORMAL <th>Recommendation</th> <th>Sample Number</th> <th></th> <th>Client Info</th> <th></th> <th>GFL0105838</th> <th>GFL0101473</th> <th>GFL0089102</th>	Recommendation	Sample Number		Client Info		GFL0105838	GFL0101473	GFL0089102
Opponent wear rates are normal.   Oil Age   bits   Client Info   5156   5084   3997     Internation   Deres is no indication of any contamination in the b.   Client Info   N/A   Changed   Changed     vid Condition   result indicates that there is suitable for further service.   CONTAMINATION   method   3.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.   <1.0.	Resample at the next service interval to monitor.	Sample Date		Client Info		22 Dec 2023	30 Nov 2023	22 Nov 2023
ontamination there is no indication of any contamination in the . Client Info NA Changed Changed Changed NORMAL NORMAL   use on indication of any contamination in the . CONTAMINATION NORMAL NORMAL NORMAL NORMAL NORMAL   use DN result indicates that there is suitable halinly remaining in the oil. The condition of the Is suitable for further service. NORMAL VOI Method >3.0 <1.0	Wear	Machine Age	hrs	Client Info		5292	5158	5084
Sample Status   NORMAL   NORMAL   NORMAL   NORMAL     uid condition   terms in onidicates that there is suitable for further service.   CONTAMINATION   method   imitbase   current   history1   finitory2     Fuel   WO Method   0.2   41.0   <1.0	All component wear rates are normal.	Oil Age	hrs	Client Info		5158	5084	3967
Sample Status   NORMAL   NORMAL   NORMAL   NORMAL   NORMAL     uid Condition   te Normal   euroran   heidoryd   instoryd     ne RD result indicates that there is suitable is suitable for further service.   WC Method   is 0.0   <1.0	Contamination	Oil Changed		Client Info		N/A	Changed	Changed
CONTAMINATION   method   iand/basic   current   History2     bid Condition   eB M result indicates that there is suitable kalinity remaining in the oil. The condition of the kalinity remaining in the oil. The condition of the Glycol   WC Method   >3.0   -1.0   <1.0		Sample Status				NORMAL	NORMAL	NORMAL
Lid Condition Fuel WC Method >3.0 <1.0 <1.0 <1.0   Nee BN result indicates that there is suitable kalinkly remaining in the oil. The condition of the Is suitable for further service. WC Method 0.2 NEG NEG NEG   Verage WC Method 0.2 NEG NEG NEG   Verage ppm ASTM DS185m >12.0 20 12 9   Chromium ppm ASTM DS185m >5.5 1 1 <1 <1   Nickel ppm ASTM DS185m >2.0 0 0 0 0   Nickel ppm ASTM DS185m >2.0 0 0 0 0   Silver ppm ASTM DS185m >2.0 0	oil.	CONTAMINAT		mothod	limit/baco	ourropt	history1	history?
Water   WC Method   >0.2   NEG   NEG   NEG     Glycol   WC Method   WC Method   NEG   NEG   NEG     Weatr   Glycol   WC Method   Imitbase   Current   History1   History1     WEAR METALS   method   Imitbase   Current   History1   History1     Nickel   ppm   ASTM 05155n   >20   1   <1	Fluid Condition						,	
Bis suitable for further service. Glycol WC Method NEG NEG NEG NEG   I'no ppm ASTM 05185n >12.0 20. 12.0 9   Chromium ppm ASTM 05185n >2.0 1 1 <1	The BN result indicates that there is suitable							
WEAR METALS   method   linit/base   current   history1   history2     Iron   ppm   ASTM 2518/m   >12.0   20   12   9     Chromium   ppm   ASTM 2518/m   >2.0   1   <1	, 0				>0.2			
Iron   ppm   ASTM D585m   >120   20   12   9     Chromium   ppm   ASTM D585m   >50   -1   -1   <1	oil is suitable for further service.	Glycol		WC Method		NEG	NEG	NEG
Chromium   ppm   ASTM D5185m   >20   <1		WEAR METAL	S	method	limit/base	current	history1	history2
Nickel ppm ASTA D5185m >5 1 1 <1   Titanium ppm ASTA D5185m >2 0 0 0   Silver ppm ASTA D5185m >2 0 0 0   Aluminum ppm ASTA D5185m >40 0 0 0   Copper ppm ASTA D5185m >40 0 0 0   Copper ppm ASTA D5185m >40 0 0 0   Vanadium ppm ASTA D5185m >40 0 0 0 0   Vanadium ppm ASTA D5185m >15 <1		Iron	ppm	ASTM D5185m	>120	20	12	9
Titanium ppm ASTM D5185m >2 0 0 <1   Silver ppm ASTM D5185m >20 2 2 1   Lead ppm ASTM D5185m >20 2 2 1   Lead ppm ASTM D5185m >330 3 3 2   Tim ppm ASTM D5185m >15 <1		Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver ppm ASTM D5185m >22 0 0 0   Aluminum ppm ASTM D5185m >20 2 2 1   Lead ppm ASTM D5185m >2300 3 3 2   Tin ppm ASTM D5185m >15 <1 <1 0   Cadmium ppm ASTM D5185m >15 <1 <1 0   Cadmium ppm ASTM D5185m >15 <1 <1 <1 0   Cadmium ppm ASTM D5185m 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1		Nickel	ppm	ASTM D5185m	>5	1	1	<1
Aluminum ppm ASTM D5185m >20 2 2 1   Lead ppm ASTM D5185m >40 0 0 0   Copper ppm ASTM D5185m >330 3 2   Tin ppm ASTM D5185m >15 <1		Titanium	ppm	ASTM D5185m	>2	0	0	<1
Lead ppm ASTM D5185m >>40 0 0 0   Copper ppm ASTM D5185m >>330 3 2   Tin ppm ASTM D5185m >>15 <1		Silver	ppm	ASTM D5185m	>2	0	0	0
Copper   ppm   ASTM D5185m   >330   3   2     Tin   ppm   ASTM D5185m   >15   <1		Aluminum	ppm	ASTM D5185m	>20	2	2	1
Tin ppm ASTM D5185m >15 <1		Lead	ppm	ASTM D5185m	>40	0	0	0
Vanadium   ppm   ASTM D5185m   0   0   <1     Cadmium   ppm   ASTM D5185m   0   0   0     ADDITIVES   method   limit/base   current   history1   history2     Boron   ppm   ASTM D5185m   0   <1		Copper	ppm	ASTM D5185m	>330	3	3	2
Cadmium   ppm   ASTM D5185m   0   0   0     ADDITIVES   method   limi/base   current   history1   history2     Boron   ppm   ASTM D5185m   0   <1		Tin	ppm	ASTM D5185m	>15	<1	<1	0
ADDITIVES   method   limit/base   current   history1   history2     Boron   ppm   ASTM D5185m   0   <1		Vanadium	ppm	ASTM D5185m		0	0	<1
Boron ppm ASTM D5185m 0 <1 <1 <1   Barium ppm ASTM D5185m 0 0 2 0   Molybdenum ppm ASTM D5185m 60 59 57 56   Manganese ppm ASTM D5185m 0 0 0 <1		Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 2 0   Molybdenum ppm ASTM D5185m 60 59 57 56   Manganese ppm ASTM D5185m 0 0 0 <1   Magnesium ppm ASTM D5185m 1010 920 877 975   Calcium ppm ASTM D5185m 1010 920 877 975   Calcium ppm ASTM D5185m 1070 1067 1079 1086   Phosphorus ppm ASTM D5185m 1150 926 914 917   Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base		ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 59 57 56   Manganesse ppm ASTM D5185m 0 0 0 <1		Boron	ppm	ASTM D5185m	0	<1	<1	<1
Manganese ppm ASTM D5185m 0 0 0 <1   Magnesium ppm ASTM D5185m 1010 920 877 975   Calcium ppm ASTM D5185m 1070 1067 1079 1086   Phosphorus ppm ASTM D5185m 1150 926 914 917   Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/cm *ASTM D7624 >20 8.9 7.5 7.0   Sulfation Abs/tmm		Barium	ppm	ASTM D5185m	0	0	2	0
Magnesium ppm ASTM D5185m 1010 920 877 975   Calcium ppm ASTM D5185m 1070 1067 1079 1086   Phosphorus ppm ASTM D5185m 1150 926 914 917   Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1   Potassium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/.mm *ASTM D7845 >30 21.1 20.1 19.8   FLUID DEGRADATION method <td></td> <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>60</td> <td>59</td> <td>57</td> <td>56</td>		Molybdenum	ppm	ASTM D5185m	60	59	57	56
Calcium ppm ASTM D5185m 1070 1067 1079 1086   Phosphorus ppm ASTM D5185m 1150 926 914 917   Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1   Potassium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/.tm *ASTM D7624 s20 8.9 7.5 7.0   Sulfation Abs/.tm *ASTM D7415 s30 21.1 20.1 19.8   FLUID DEGRADATION method<		Manganese	ppm	ASTM D5185m	0	0	0	<1
Phosphorus ppm ASTM D5185m 1150 926 914 917   Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1 3   Potassium ppm ASTM D5185m >20 3 2 1 3   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/tmm<*ASTM D7744 >30 21.1 20.1 19.8   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/tm		Magnesium	ppm	ASTM D5185m	1010	920	877	975
Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1   Potassium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/cm *ASTM D7624 >20 8.9 7.5 7.0   Sulfation Abs/tmm *ASTM D7415 >30 21.1 20.11 19.8   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/tmm		Calcium	ppm	ASTM D5185m	1070	1067	1079	1086
Zinc ppm ASTM D5185m 1270 1204 1169 1311   Sulfur ppm ASTM D5185m 2060 2826 4074 2910   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 3 2 1   Potassium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/cm *ASTM D7624 >20 8.9 7.5 7.0   Sulfation Abs/1mm *ASTM D7415 >30 21.1 20.1 19.8   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.1mm		Phosphorus	ppm	ASTM D5185m	1150	926	914	917
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25494SodiumppmASTM D5185m>2013PotassiumppmASTM D5185m>20321INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.90.60.6NitrationAbs/cm*ASTM D7624>208.97.57.0SulfationAbs/tmm*ASTM D7415>3021.120.119.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/tmm*ASTM D7414>2517.015.315.1			ppm	ASTM D5185m	1270	1204	1169	1311
Silicon ppm ASTM D5185m >25 4 9 4   Sodium ppm ASTM D5185m >20 2 1 3   Potassium ppm ASTM D5185m >20 3 2 1   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.9 0.6 0.6   Nitration Abs/cm *ASTM D7624 >20 8.9 7.5 7.0   Sulfation Abs/.tmm *ASTM D7415 >30 21.1 20.1 19.8   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.tmm *ASTM D7414 >25 17.0 15.3 15.1		Sulfur	ppm	ASTM D5185m	2060	2826	4074	2910
Sodium   ppm   ASTM D5185m   2   1   3     Potassium   ppm   ASTM D5185m   >20   3   2   1     INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >4   0.9   0.6   0.6     Nitration   Abs/rm   *ASTM D7624   >20   8.9   7.5   7.0     Sulfation   Abs/.1mm   *ASTM D7415   >30   21.1   20.1   19.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1		CONTAMINAN	TS	method	limit/base	current	history1	history2
Sodium   ppm   ASTM D5185m   2   1   3     Potassium   ppm   ASTM D5185m   >20   3   2   1     INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >4   0.9   0.6   0.6     Nitration   Abs/rm   *ASTM D7624   >20   8.9   7.5   7.0     Sulfation   Abs/.1mm   *ASTM D7415   >30   21.1   20.1   19.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1		Silicon	ppm	ASTM D5185m	>25	4	9	4
Potassium   ppm   ASTM D5185m   >20   3   2   1     INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >4   0.9   0.6   0.6     Nitration   Abs/cm   *ASTM D7624   >20   8.9   7.5   7.0     Sulfation   Abs/.1mm   *ASTM D7415   >30   21.1   20.1   19.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1								
Soot %   %   *ASTM D7844   >4   0.9   0.6   0.6     Nitration   Abs/cm   *ASTM D7624   >20   8.9   7.5   7.0     Sulfation   Abs/.1mm   *ASTM D7415   >30   21.1   20.1   19.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1		Potassium			>20		2	
Nitration   Abs/cm   *ASTM D7624   >20   8.9   7.5   7.0     Sulfation   Abs/.1mm   *ASTM D7415   >30   21.1   20.1   19.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1		INFRA-RED		method	limit/base	current	history1	history2
Nitration   Abs/cm   *ASTM D7624   >20   8.9   7.5   7.0     Sulfation   Abs/.1mm   *ASTM D7415   >30   21.1   20.1   19.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1			%	*ASTM D7844	>4	0.9	0.6	0.6
SulfationAbs/.1mm*ASTM D7415>30 <b>21.1</b> 20.119.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>25 <b>17.0</b> 15.315.1								
Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1								
Oxidation   Abs/.1mm   *ASTM D7414   >25   17.0   15.3   15.1				method	limit/base			history2
Dase Number (DIN) mg KUHig ASIM D2896 9.8 (.1 7.8 7.9					> 2F	17.0	15.0	15 1
		Oxidation	Abs/.1mm	*ASTM D7414				



## **OIL ANALYSIS REPORT**

VISUAL



	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
23 - 23 - 23 - 23 - 23 - 23 - 23 - 23 -		scalar	*Visual	NORML	NORML	NORML	NORML
Nov16/23 Nov22/23 Nov30/23	Odor						
2 2 2 2 0	000	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
	Free Water	scalar	*Visual		NEG	NEG	NEG
	FLUID PROPE	RTIES	method	limit/base	current	history1	history2
	Visc @ 100°C	cSt	ASTM D445	15.4	13.9	13.8	13.7
	GRAPHS						
	Ferrous Alloys						
	iron						
Nov16/23 Nov22/23 Nov30/23	100 - chromium						
Nc No	80-						
	Ē 60-						
	40						
	20						
		3/23 -	2/23 -	2/23 -			
	Jui22/22 Mar27/23 Jun21/23	Nov16/23	Nov22/23 Nov30/23	Dec22/23			
	Non-ferrous Metal						
	120						
	100 - copper						
	management tin						
	80						
	Ē 60						
	40						
	20						
	0						
	Jui22/22 Mar27/23 Jun21/23	Nov16/23	Nov22/23 Nov30/23	Dec22/23			
	Juli Mari	Novi	Novà	Deci			
	Viscosity @ 100°C	:			Base Number		
	18 - Abnormal			10.0	Base		
	17-				•		
	16 Base			KOH			
	© 15 00 014	1		Bu 6.0			
	vi 13 Abnorma			0.0 0.0 8 Base Mumber 4.0	ļ.		
	12			ase N			
	11			<sup>66</sup> 2.0	•		
	10			0.0			
	5 . · · ·	3/23	2/23 -		1/23	1/23 -	1/23
	Jul22/22 Mar27/23 Jun21/23	Nov16/23	Nov22/23 Nov30/23	Dec22/23	Jul22/22 Mar27/23	Jun21/23 Nov16/23 Nov2/23	Nov30/23
Laboratory Sample No. Lab Number Unique Number Test Package	: 06045864 er : 10806472	501 Madis Recieved Diagnose Diagnost	d : 27 [ ed : 28 [	ry, NC 27513 Dec 2023 Dec 2023 s Davis	3 GFL Env		- Michigan Eas 6200 Elmridge ing Heights, M US 48313 ct: Frank Wolal