

## **OIL ANALYSIS REPORT**

Sample Rating Trend





## Machine Id 920029

Fluid

Component **Diesel Engine** 

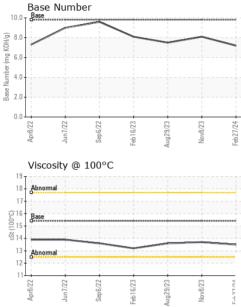
## PETRO CANADA DURON SHP 15W40 (--- GAL)

Recommendation   Sample Number   Client Info   GFL0104566   GFL0092617   GFL0092631     Resample at the next service interval to monitor.   Sample Date   Glient Info   27 F6 2024   06 Nov 2002   29 Aug 2023     All component wear rates are normal.   Containlation   Gli Age   hrs   Client Info   G6347   G77.0   5422     Oll Changed   Client Info   G6347   G77.0   5422   610     Containlation   Containlation   Normal   NorRMAL   NorRMAL <td< th=""><th></th><th>·</th><th>,</th><th>AprZUZZ</th><th>Jun2022 Sep2022</th><th>Feb2023 Aug2023 Nov2023</th><th>Feb2024</th><th></th></td<>		·	,	AprZUZZ	Jun2022 Sep2022	Feb2023 Aug2023 Nov2023	Feb2024	
Resample at the next service interval to monitor.   Name   Client info   27 Feb 2024   68 Nov 2023   24 Aug 2023     Machine Age   hrs   Client Info   5347   5770   5342     Anomponent wear rates are normal.   Oil Age   hrs   Client Info   6347   6770   5342     There is no indication of any contamination in the l.   There is no indication of any contamination in the l.   Client Info   Client Info   Common NorMAL   NORMAL   NORMAL   NORMAL   NORMAL   NORMAL   NORMAL   NORMAL   NorMAL   Client Info   Client Info <th>DIAGNOSIS</th> <th>SAMPLE INFOR</th> <th>MATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	DIAGNOSIS	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Word All component wear rates are normal. Contamination Gene in indication of any contamination in the it.   There is in indicates that there is suitable addinity remaining in the oil. The condition of the suitable is suitable for further service. OI Changed Client Info G99 462 610   Fuel Condition The bit out of the service. VIC Mathod NoRMAL NORMAL NORMAL NORMAL   Fuel Condition The bit out of the service. VIC Mathod indicate Inticate inticate inticate NEG NEG NEG   Situable for further service. Fuel WIC Method 3:0 <1.0 <1.0 inticate inticat	Recommendation	Sample Number		Client Info		GFL0104566	GFL0092617	GFL0092631
Diage   Ins   Clean Info   609   482   610     Contamination   There is no indication of any contamination in the oil.   There is no indication of any contamination in the oil.   Contamination   Clean Info   Changed   NORMAL	Resample at the next service interval to monitor.	Sample Date		Client Info		27 Feb 2024	08 Nov 2023	29 Aug 2023
Contamination There is no indication of any contamination in the oil.   Cli Changed Sample Status   Client Info   Changed NoRMAL   NoRMAL NORMAL   NoRMAL NORMAL   NoRMAL NORMAL     Fuel Contition The BY result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.   NoC MAINATION   motioa   eurent   history   history     Fuel Contamination in the oil is suitable for further service.   WC Method   s.0.   <1.0	Wear	Machine Age	hrs	Client Info		6347	5770	5342
Sample Status   NORMAL   NORMAL   NORMAL   NORMAL     Date is an indication of any contamination in the all   Sample Status   Imitbase   current   Imitbase   Curent   Imitbase   Current	All component wear rates are normal.	Oil Age	hrs	Client Info		609	462	610
Sample Status   NORMAL   NORMAL   NORMAL   NORMAL   NORMAL     PLid Condition   The Breach indicates that there is suitable alkalmity remaining in the oil. The condition of the oil is suitable for further service.   WC Method   >3.0   <1.0	Contamination	Oil Changed		Client Info		Changed	Not Changd	Changed
Oli CONTAMINATION method limitbase current history1 history2   Fuel WC Method >3.0 <1.0		Sample Status				NORMAL	NORMAL	NORMAL
The BV result indicates that there is suitable addating remaining in the oil. The condition of the oil is suitable for further service.   Fuel   WC Method   Sol   Clo   NEG   NEG   NEG     Wear   WC Method   Sol   NEG   NEG   NEG   NEG   NEG     I'on   ppm   ASTM 05186n   >120   11   8   18     Chromium   ppm   ASTM 05186n   >20   0   0   1     Nckel   ppm   ASTM 05186n   >20   0   0   1     Nckel   ppm   ASTM 05186n   >20   0   0   1   2     Aluminium   ppm   ASTM 05186n   >2   0   0   1   2     Copper   ppm   ASTM 05186n   >30   0   <1   2   1     Variadium   ppm   ASTM 05186n   >16   1   0   0   0     Cadmium   ppm   ASTM 05186n   0   1   0   0   1   1     Variadium	oil.	CONTAMINAT	ION	method	limit/base	current	history1	history2
Mater   WG Method   >0.2   NEG   NEG   NEG     airalinity remaining in the oil. The condition of the oil is suitable for further service.   WG Method   >0.2   NEG   NEG   NEG     WEAR METALS   WC Method   WC Method   NEG   NEG   NEG     Ion   ppm   ASTM05185n   >120   0   <1		Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Glycol   WC Method   NEG   NEG   NEG     oil is suitable for further service.   Glycol   WC Method   Imitbase   current   history1   history2     Iron   ppm   ASTM D5155   >20   0   <1								
WEAR METALS   method   im/base   current   history1   history2     Iron   ppm   ASTM 0585m   >120   11   8   18     Chromium   ppm   ASTM 0585m   >20   0   <1								
Iron ppm ASTM D5185m >12.0 11 8 18   Chromium ppm ASTM D5185m >2.0 0 -1 1   Nickel ppm ASTM D5185m >2 0 0 -1   Titanium ppm ASTM D5185m >2 0 0 -1   Silver ppm ASTM D5185m >2 0 0 -1   Auminum ppm ASTM D5185m >2 0 0 -1   Lead ppm ASTM D5185m >40 0 -1 2   Copper ppm ASTM D5185m >150 -1 -1 -1 2   Cadmium ppm ASTM D5185m 0 0 -1 -1 2   Boron ppm ASTM D5185m 0 1 0 0 -1 -1 -1   Barinum ppm ASTM D5185m 0 1 0 0 -1 -1 -1   Manganese ppm ASTM D5185m 0 0 -1 -1		-	S		limit/base			
Chromium   ppm   XSTM D5185m   >20   0   <1   1     Nickel   ppm   XSTM D5185m   >5   0   0   0     Titanium   ppm   XSTM D5185m   >2   0   0   <1								
Nickel ppm ASTM D518m >5 0 0 0   Titanium ppm ASTM D518m >2 0 0 <1								
Titanium ppm ASTM D5185m >2 0 0 <1   Silver ppm ASTM D5185m >22 0 0 <1								
Silver ppm ASTM 05185m >20 0 <1 2 0   Aluminum ppm ASTM 05185m >40 0 <1 2 0   Lead ppm ASTM 05185m >4330 0 <1 2 0   Copper ppm ASTM 05185m >15 <1 <1 <1 <1   Vanadium ppm ASTM 05185m 15 <1 <1 <1 <1   Qardium ppm ASTM 05185m 0 <1 <1 <1 <1   Qardium ppm ASTM 05185m 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<								
Atuminum   ppm   ASTM D5185m   >20   1   2   0     Lead   ppm   ASTM D5185m   >40   0   <1						-		
Lead ppm ASTM D5185m >40 0 <1			ppm					
Copper   ppm   ASTM D5165m   >330   0   <1   2     Tin   ppm   ASTM D5165m<>15   <1		Aluminum	ppm	ASTM D5185m	>20			
Tin ppm ASTM D5185m >15 <1		Lead	ppm	ASTM D5185m	>40	0		
Vanadium   ppm   ASTM D5185m   0   0   <1     Cadmium   ppm   ASTM D5185m   0   0   0     ADDITIVES   method   linit/base   current   history1   history2     Boron   ppm   ASTM D5185m   0   <1		Copper	ppm	ASTM D5185m	>330	0	<1	2
Cadmium   ppm   ASTM D5185m   0   0   0     ADDITIVES   method   limit/base   current   history1   history2     Boron   ppm   ASTM D5185m   0   <1		Tin	ppm	ASTM D5185m	>15	<1	<1	<1
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m0<1		Vanadium	ppm	ASTM D5185m		0	0	<1
Boron ppm ASTM D5185m 0 <1 2 1   Barium ppm ASTM D5185m 0 1 0 0   Molybdenum ppm ASTM D5185m 60 64 57 61   Manganesse ppm ASTM D5185m 0 0 <1 <1 <1   Magnesium ppm ASTM D5185m 1010 1040 934 1161   Calcium ppm ASTM D5185m 1070 1080 992 1269   Phosphorus ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   Sulfur ppm ASTM D5185m 225 4 4 6   Sodium ppm ASTM D5185m >20 0 2 2   Silicon ppm ASTM D5185m >20 0 2 2   Sodium ppm ASTM D5185m >20 0.5 0.5 0.8   Soto % % *ASTM D5185m <td rowspan="2"></td> <td>Cadmium</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>0</td> <td>0</td> <td>0</td>		Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 1 0 0   Molybdenum ppm ASTM D5185m 60 64 57 61   Manganese ppm ASTM D5185m 0 0 -1 <1   Magnesium ppm ASTM D5185m 1010 1040 9344 1161   Calcium ppm ASTM D5185m 1070 1080 992 1269   Phosphorus ppm ASTM D5185m 1150 1087 958 1085   Sulfur ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 260 2749 2881 3750   CONTAMINANTS method imit/base current history1 history2   Silicon ppm ASTM D5185m >20 0 2 2   Sodium ppm ASTM D5185m >20 0.6 0.5 0.8   Notassium ppm ASTM D5185m >20 0.6 0.5 0.8   Notassium ppm A		ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 60 64 57 61   Manganese ppm ASTM D5185m 0 0 <1 <1   Magnesium ppm ASTM D5185m 1010 1040 934 1161   Calcium ppm ASTM D5185m 1070 1080 992 1269   Phosphorus ppm ASTM D5185m 1170 1087 958 1085   Zinc ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   Sulfur ppm ASTM D5185m 220 10.1 8.9 16.9   Sodium ppm ASTM D5185m 220 10.1 8.9 10.1   Nitration <t< th=""><th></th><th>Boron</th><th>ppm</th><th>ASTM D5185m</th><th>0</th><th>&lt;1</th><th>2</th><th>1</th></t<>		Boron	ppm	ASTM D5185m	0	<1	2	1
Marganese ppm ASTM D5185m 0 0 <1 <1   Magnesium ppm ASTM D5185m 1010 1040 934 1161   Calcium ppm ASTM D5185m 1070 1080 992 1269   Phosphorus ppm ASTM D5185m 1150 1087 958 1085   Zinc ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >20 0 0 2   Solium ppm ASTM D5185m >20 0 0 2   INFRA-RED method limit/base current history1 history2   Soot % % 'ASTM D7844 >4 0.6 0.5 0.8   Nitration Abs/cm 'ASTM D7624 >20 10.1 8.9 10.1   Sulfation Abs/lm		Barium	ppm	ASTM D5185m	0	1		0
Magnesium ppm ASTM D5185m 1010 1040 934 1161   Calcium ppm ASTM D5185m 1070 1080 992 1269   Phosphorus ppm ASTM D5185m 1150 1087 958 1085   Zinc ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >20 0 0 2   Sodium ppm ASTM D5185m >20 0 0 2   Sodium ppm ASTM D5185m >20 0 0 2   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.6 0.5 0.8   Nitration Abs/tmm<*ASTM D7845		Molybdenum	ppm	ASTM D5185m	60	64		
Calcium ppm ASTM D5185m 1070 1080 992 1269   Phosphorus ppm ASTM D5185m 1150 1087 958 1085   Zinc ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 4 6   Sodium ppm ASTM D5185m >20 0 0 2   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.6 0.5 0.8   Nitration Abs/cm *ASTM D7624 >20 10.1 8.9 10.1   Sulfation Abs/lmm *ASTM D7624 >30 20.8 20.3 21.2   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Ab		Manganese	ppm	ASTM D5185m	0	0	<1	<1
Phosphorus ppm ASTM D5185m 1150 1087 958 1085   Zinc ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 4 6   Sodium ppm ASTM D5185m >20 0 0 21   INFRA-RED method limit/base current history1 history2   Soot % % 'ASTM D7824 >4 0.6 0.5 0.8   Nitration Abs/m 'ASTM D7824 >20 10.1 8.9 10.1   Sulfation Abs/m 'ASTM D7824		Magnesium	ppm	ASTM D5185m	1010	1040	934	1161
Zinc ppm ASTM D5185m 1270 1299 1228 1390   Sulfur ppm ASTM D5185m 2060 2749 2881 3750   CONTAMINANTS method limit/base current history1 history2   Silicon ppm ASTM D5185m >25 4 4 6   Sodium ppm ASTM D5185m >25 4 4 6   Sodium ppm ASTM D5185m >25 4 4 6   Sodium ppm ASTM D5185m >20 0 0 2   INFRA-RED method limit/base current history1 history2   Soot % % *ASTM D7844 >4 0.6 0.5 0.8   Nitration Abs/cm *ASTM D7624 >20 10.1 8.9 10.1   Sulfation Abs/.tmm *ASTM D7415 >30 20.3 20.3 21.2   FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.tmm		Calcium	ppm	ASTM D5185m	1070	1080	992	1269
SulfurppmASTM D5185m2060274928813750CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25446SodiumppmASTM D5185m>20438PotassiumppmASTM D5185m>20002INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.60.50.8NitrationAbs/cm*ASTM D7624>2010.18.910.1SulfationAbs/1m*ASTM D7415>3020.820.321.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/1m*ASTM D7414>2517.816.817.8		Phosphorus	ppm	ASTM D5185m	1150	1087	958	1085
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25446SodiumppmASTM D5185m>20438PotassiumppmASTM D5185m>20002INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.60.50.8NitrationAbs/cm*ASTM D7624>2010.18.910.1SulfationAbs/1m*ASTM D7415>3020.820.321.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/1m*ASTM D7414>2517.816.817.8		Zinc	ppm	ASTM D5185m	1270	1299	1228	1390
SiliconppmASTM D5185m>25446SodiumppmASTM D5185mI438PotassiumppmASTM D5185m>20002INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.60.50.8NitrationAbs/cm*ASTM D7624>2010.18.910.1SulfationAbs/1m*ASTM D7615>3020.820.321.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/1m*ASTM D741>2517.816.817.8		Sulfur	ppm	ASTM D5185m	2060	2749	2881	3750
SodiumppmASTM D5185m438PotassiumppmASTM D5185m>20002INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.60.50.8NitrationAbs/cm*ASTM D7624>2010.18.910.1SulfationAbs/.1mm*ASTM D7415>3020.820.321.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.816.817.8		CONTAMINAN	NTS	method	limit/base	current	history1	history2
PotassiumppmASTM D5185m>20002INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.60.50.8NitrationAbs/cm*ASTM D7624>2010.18.910.1SulfationAbs/1mm*ASTM D7415>3020.820.321.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/1mm*ASTM D7414>2517.816.817.8		Silicon	ppm	ASTM D5185m	>25	4	4	6
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.60.50.8NitrationAbs/cm*ASTM D7624>2010.18.910.1SulfationAbs/.1mm*ASTM D7415>3020.820.321.2FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.816.817.8		Sodium	ppm	ASTM D5185m		4	3	8
Soot %   %   *ASTM D7844   >4   0.6   0.5   0.8     Nitration   Abs/cm   *ASTM D7624   >20   10.1   8.9   10.1     Sulfation   Abs/.1mm   *ASTM D7415   >30   20.8   20.3   21.2     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.8   16.8   17.8		Potassium	ppm	ASTM D5185m	>20	0	0	2
Nitration   Abs/cm   *ASTM D7624   >20   10.1   8.9   10.1     Sulfation   Abs/.1mm   *ASTM D7615   >30   20.8   20.3   21.2     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.8   16.8   17.8		INFRA-RED		method	limit/base	current	history1	history2
Nitration   Abs/cm   *ASTM D7624   >20   10.1   8.9   10.1     Sulfation   Abs/.1mm   *ASTM D7415   >30   20.8   20.3   21.2     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   17.8   16.8   17.8		Soot %	%	*ASTM D7844	>4	0.6	0.5	0.8
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.816.817.8		Nitration	Abs/cm	*ASTM D7624	>20	10.1	8.9	10.1
Oxidation   Abs/.1mm   *ASTM D7414   >25   17.8   16.8   17.8		Sulfation	Abs/.1mm	*ASTM D7415	>30	20.8	20.3	21.2
		FLUID DEGRA		method	limit/base	current	history1	history2
		Oxidation	Abs/.1mm	*ASTM D7414	>25	17.8	16.8	17.8
						7.2	8.1	7.5



## **OIL ANALYSIS REPORT**

VISUAL



			*) // 1	NONE	NONE	NONE	NONE	
	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	
Feb16/23 Aug29/23 Nov6/23 Feb27/24	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
Au N N	Odor	scalar	*Visual	NORML	NORML	NORML	NORML	
°C	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	13.5	13.7	13.6	
	GRAPHS							
	Ferrous Alloys							
Fib16/23 Aug29/23 Nov8/23	Non-ferrous Metal	Legi 10'23	Aug23/23	Feb27724				
	2ZJglidy Viscosity @ 100°C	Feb16/23	Aug29/23	Feb27/24				
	<sup>19</sup>			10.0	Base Number		*****	
	18 - Abnormal							
	17			IB/HO:				
	() Base Base 15 15 15 14			0.9 Base Number (mg KOH/g)				
	ts 14				1			
	12			ase Nr				
	13 Abnormal			<u>2.0</u>				
	11			0.0				
	: Apr8/22 : Jun 7/22 : Sep6/22 :	Feb 16/23 -	Aug 29/23 . Nov8/23 .	Feb27/24	Apr8/22 - Jun7/22 - Sep6/22 -	Feb16/23 -	Nov8/23 - Feb27/24 -	
	Ap Jur Sep	Feb1	Aug	Feb	Ap Jur Sep	Feb1 Aug2	Non Feb2	
	: 10912740 Diagnosed : 06 Mar 2024 - Wes Davis US 53032							
Statements of conformity to sp					rule (JCGM 106:		F:	

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Submitted By: Seel also GFL947 - Tim Kieffer