

## **OIL ANALYSIS REPORT**

Sample Rating Trend





Machine Id 913046

Fluid

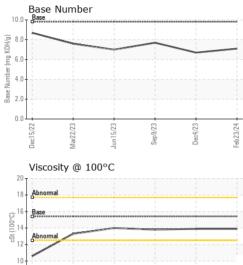
Component **Diesel Engine** 

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

RecommendationResample at the next service interval to monitor.WearAll component wear rates are normal.ContaminationThere is no indication of any contamination in the oil.Fluid ConditionThe BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the			- ,	Dec2022	Mar2023 Jun202	3 Sep2023 Dec2023	Feb2024	
Resample Date       Cleant info       29 Feb 2024       04 Dec 2023       00 Sep 2023.         Machine Age       Ins       Client info       3056       30.09       2449         Al component wear rates are normal.       Oil Age       Ins       Client info       583       60.0       60.0       60.0       Client info       583       60.0	DIAGNOSIS	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Wear       All component wear ates are normal.       Machine Age       hrs       Client Info       3630       640       640         Contamination       Client Info       Client Info       Client Info       Client Info       S30       600       600         The In soin indication of any contamination in toil.       Client Info       Client Info       Client Info       Client Info       S400       All one and to the soin Info       Nor MAL       NORMAL       NO       All on on on NORMAL       NORMAL       NORMAL       NORMAL       NO       All on on NORMAL       NORMAL	Recommendation	Sample Number		Client Info		GFL0104574	GFL0092603	GFL0092634
All component wear rates are normal.     Oil Age     htts     Client Info     630     600     600       Contaniation     There is no indication of any contamination in the oil.     Sample Status     Client Info     Changed     NORMAL	Resample at the next service interval to monitor.	Sample Date		Client Info		23 Feb 2024	04 Dec 2023	09 Sep 2023
Contamination     Cleanaged     Cleanaged     Cleanaged     Not Chanaged     Not Cha	Wear	Machine Age	hrs	Client Info		3656	3049	2449
Sample Status       NORMAL       NORMAL       NORMAL       NORMAL       NORMAL         Out       CONTAMINATION       method       limit/base       current       history1       history1         The Pluid Condition       The Bit result indicates that there is suitable all is suitable for further service.       NC Method       3.0       <1.0	All component wear rates are normal.	Oil Age	hrs	Client Info		630	600	600
Sample Status       NORMAL       NORMAL       NORMAL       NORMAL       NORMAL       NORMAL         Fuil Condition       The Sh result indicates that there is suitable distainty remaining in the 0i. The sonthion of the 0 is suitable for further service.       ONTAMINATION       retherd       S0.0       <1.0	Contamination	Oil Changed		Client Info		Changed	Not Changd	Changed
Oil.       CONTAMINATION       method       imitbase       current       history1       history2         Fuel       WC Method       >3.0       <1.0		Sample Status				NORMAL	NORMAL	NORMAL
Fluid Condition       Puel       WC Method       >3.0       <1.0	oil.	CONTAMINAT	ION	method	limit/base	current	history1	history2
Unter Seruit indicates naturate is suitable aliality remaining in the oil. The condition of the oil is suitable for further service.       Water (Give)       WC Method       NEG       NEG       NEG       NEG         Givel       WC Method       WC Method       Imit/base       current       NEG       NEG         Givel       WC Method       Imit/base       current       NEG       NEG         No ppm       ASTU 05185n       >120       16       21       18         Onromium       ppm       ASTU 05185n       >20       <1	Fluid Condition			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 05165m       >20       16       21       18         Chromium       ppm       ASTM 05165m       >20       1       4       1         Nickel       ppm       ASTM 05165m       >22       1       0       -1         Nickel       ppm       ASTM 05165m       >20       1       2       2         Aluminum       ppm       ASTM 05165m       >20       1       2       2         Lead       ppm       ASTM 05165m       >20       1       2       2         Lead       ppm       ASTM 05165m       >40       0       0       0         Copper       ppm       ASTM 05165m       >300       2       4       9         Tin       ppm       ASTM 05165m       0       0       0       0       0         Cadmium       ppm       ASTM 05165m       0       0								
Iron       ppm       ASTM D5185m       >120       16       21       18         Chromium       ppm       ASTM D5185m       >20       <1       <1       <1         Nickel       ppm       ASTM D5185m       >2       0       0       0         Silver       ppm       ASTM D5185m       >2       11       2       2         Lead       ppm       ASTM D5185m       >20       1       2       2         Lead       ppm       ASTM D5185m       >20       1       2       2         Lead       ppm       ASTM D5185m       >40       0       0       0         Copper       ppm       ASTM D5185m       >40       0       0       0         Cadmium       ppm       ASTM D5185m       0       0       0       0       0         Astm D17VES       method       Imitbase       current       Historyt       Historyt       Historyt         Manganese       ppm       ASTM D5185m       0       0       0       0         Molybdenum       ppm       ASTM D5185m       100	oil is suitable for further service.							
Iron     ppm     ASTM D5185m     >120     16     21     18       Chromium     ppm     ASTM D5185m     >20     <1		-	S	method	limit/base	current	history1	history2
Ohromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >5     <1								
Nickel     ppm     ASTM 0518m     >5     <1     4     1       Titanium     ppm     ASTM 0518m     >2     0     0     0       Silver     ppm     ASTM 0518m     >20     1     2     2       Lead     ppm     ASTM 0518m     >40     0     0     0       Copper     ppm     ASTM 0518m     >40     0     0     0       Tin     ppm     ASTM 0518m     >40     0     0     0     0       Vanadium     ppm     ASTM 0518m     >40     0     0     0     0       Cadmium     ppm     ASTM 0518m     0     0     0     0     0       Barium     ppm     ASTM 0518m     0     0     0     0     0       Magnesium     ppm     ASTM 0518m     0     0     0     0     0     0       Magnesium     ppm     ASTM 0518m     0     0     100     103     100     103       Notestam     ppm     ASTM 0518m     1010     980     1028     1069     1163								
Titanium     ppm     ASTM D5185m     >2     0     0     0       Silver     ppm     ASTM D5185m     >20     1     2     2       Auminum     ppm     ASTM D5185m     >20     1     2     2       Lead     ppm     ASTM D5185m     >330     2     4     9       Tin     ppm     ASTM D5185m     >15     <1								
Silver     ppm     ASTM D5185m     >20     1     2     2       Aluminum     ppm     ASTM D5185m     >20     1     2     2       Lead     ppm     ASTM D5185m     >330     2     4     9       Tin     ppm     ASTM D5185m     >15     <11     <1     1       Vanadium     ppm     ASTM D5185m     >15     <11     <1     1       Vanadium     ppm     ASTM D5185m     >15     <11     <1     1       Vanadium     ppm     ASTM D5185m     0     0     0     0       ADDITIVES     method     Imit/base     current     history1     history2       Barium     ppm     ASTM D5185m     0     0     0     0       Magnessum     ppm     ASTM D5185m     1010     980     1028     1069       Calcium     ppm     ASTM D5185m     1150     1036     1008     1058       Piosphorus     ppm     ASTM D5185m     1010     980     1028     344       D00     Qatestim     ppm     ASTM D5185m								
Aluminum     ppm     ASTM D5185m     >20     1     2     2       Lead     ppm     ASTM D5185m     >40     0     0     0       Copper     ppm     ASTM D5185m     >3300     2     4     9       Tin     ppm     ASTM D5185m     >15     <1								
Lead     ppm     ASTM D5185m     >40     0     0     0       Copper     ppm     ASTM D5185m     >330     2     4     9       Tin     ppm     ASTM D5185m     >15     <1								
Copper       ppm       ASTM D5185m       >330       2       4       9         Tin       ppm       ASTM D5185m       >15       <1								
Tin     ppm     ASTM D5185m     >15     <1								
Vanadium       ppm       ASTM D5185m       0       0       0         Cadmium       ppm       ASTM D5185m       0       0       0         ADDITIVES       method       limit/base       current       history1       history2         Boron       ppm       ASTM D5185m       0       4       0       1         Barium       ppm       ASTM D5185m       0       4       0       0         Molybdenum       ppm       ASTM D5185m       0       60       60       64         Magnaesium       ppm       ASTM D5185m       1010       980       1028       1069         Calcium       ppm       ASTM D5185m       1070       1054       1106       1163         Phosphorus       ppm       ASTM D5185m       1070       1054       1008       1058         Zinc       ppm       ASTM D5185m       1070       1054       1106       1163         Phosphorus       ppm       ASTM D5185m       2060       2736       2824       3344         CONTAMINANTS       method       limit/base       current       history1 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
Cadmium       ppm       ASTM D5185m       0       0       0         ADDITIVES       method       limit/base       current       history1       history2         Boron       ppm       ASTM D5185m       0       4       0       1         Barium       ppm       ASTM D5185m       0       0       0       0         Molybdenum       ppm       ASTM D5185m       0       <1					>15			
ADDITIVES       method       limit/base       current       history1       history2         Boron       ppm       ASTM D5185m       0       4       0       1         Barium       ppm       ASTM D5185m       0       0       0       0         Molybdenum       ppm       ASTM D5185m       60       60       65       64         Magnesse       ppm       ASTM D5185m       0       <1								
Boron     ppm     ASTM D5185m     0     4     0     1       Barium     ppm     ASTM D5185m     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     60     65     64       Manganese     ppm     ASTM D5185m     0			ррш		line it //e e e e	-		
Barium     ppm     ASTM D5185m     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     60     65     64       Manganese     ppm     ASTM D5185m     0     <1     0     <1       Magnesium     ppm     ASTM D5185m     1010     980     1028     1069       Calcium     ppm     ASTM D5185m     1070     1054     1106     1163       Phosphorus     ppm     ASTM D5185m     1070     1036     1008     1058       Zinc     ppm     ASTM D5185m     1270     1275     1322     1349       Sulfur     ppm     ASTM D5185m     2060     2736     2824     3344       CONTAMINANTS     method     limit/base     current     history1     history2       Sulfur     ppm     ASTM D5185m     >25     3     5     5       Sodium     ppm     ASTM D5185m     >20     0     2     1       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     'ASTM D5185m <th></th> <th></th> <th></th> <th></th> <th></th> <th>current</th> <th></th> <th></th>						current		
Molybdenum     ppm     ASTM D5185m     60     60     65     64       Manganesee     ppm     ASTM D5185m     0     <1								
Manganese     ppm     ASTM D5185m     0     <1     0     <1       Magnesium     ppm     ASTM D5185m     1010     980     1028     1069       Calcium     ppm     ASTM D5185m     1070     1054     1106     1163       Phosphorus     ppm     ASTM D5185m     1070     1036     1008     1058       Zinc     ppm     ASTM D5185m     1150     1036     1008     1058       Sulfur     ppm     ASTM D5185m     1270     1275     1322     1349       Sulfur     ppm     ASTM D5185m     2060     2736     2824     3344       CONTAMINANTS     method     imit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     0     2     1       Potassium     pm     ASTM D5185m     >20     0     2     1       NFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7644     >4     0.9     1     0.3       Nitration     Abs/m								
Magnesium     ppm     ASTM D5185m     1010     980     1028     1069       Calcium     ppm     ASTM D5185m     1070     1054     1106     1163       Phosphorus     ppm     ASTM D5185m     1150     1036     1008     1058       Zinc     ppm     ASTM D5185m     1270     1275     1322     1349       Sulfur     ppm     ASTM D5185m     2060     2736     2824     3344       CONTAMINANTS     method     imit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     5     5       Sodium     ppm     ASTM D5185m     >20     0     2     1       Potassium     ppm     ASTM D5185m     >20     0     2     1       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7624     >20     9.8     10.1     0.0       Nitration     Abs/cm     *ASTM D7624     >20     9.8     10.1     10.0       Sulfation     Abs/Imm								
Calcium     ppm     ASTM D5185m     1070     1054     1106     1163       Phosphorus     ppm     ASTM D5185m     1150     1036     1008     1058       Zinc     ppm     ASTM D5185m     1270     1275     1322     1349       Sulfur     ppm     ASTM D5185m     2060     2736     2824     3344       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     5     5       Sodium     ppm     ASTM D5185m     >20     0     2     1       Potassium     ppm     ASTM D5185m     >20     0     2     1       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >4     0.9     1     0.3       Nitration     Abs/cm     *ASTM D7824     >20     9.8     10.1     10.0       Sulfation     Abs/cm     *ASTM D7824     >20     9.8     10.1     10.0       Sulfation     Abs/cm		ů.						
Phosphorus     ppm     ASTM D5185m     1150     1036     1008     1058       Zinc     ppm     ASTM D5185m     1270     1275     1322     1349       Sulfur     ppm     ASTM D5185m     2060     2736     2824     3344       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     5     5       Sodium     ppm     ASTM D5185m     >20     0     2     1       Potassium     ppm     ASTM D5185m     >20     0     2     1       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D5185m     >20     0     2     1       Nitration     Abs/cm     *ASTM D5185m     >20     0.9     1     0.3       Nitration     Abs/cm     *ASTM D7624     >20     9.8     10.1     10.0       Sulfation     Abs/tm     *ASTM D7645     >30     21.4     21.9     24.3       FLUID DEGRAUTION     Method <th></th> <th>-</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>		-						
Zinc     ppm     ASTM D5185m     1270     1275     1322     1349       Sulfur     ppm     ASTM D5185m     2060     2736     2824     3344       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     3     5     5       Sodium     ppm     ASTM D5185m     >25     3     5     4       Potassium     ppm     ASTM D5185m     >20     0     2     1       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >4     0.9     1     0.3       Nitration     Abs/Limm     *ASTM D7624     >20     9.8     10.1     10.0       Sulfation     Abs/Limm     *ASTM D7644     >4     0.9     1     0.3       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/Limm     *ASTM D7414     >25     17.9     18.3     18.4								
SulfurppmASTM D5185m2060273628243344CONTAMINATYmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25355SodiumppmASTM D5185m>20454PotassiumppmASTM D5185m>20021INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.910.3NitrationAbs/cm*ASTM D7414>209.810.110.0SulfationAbs/cm*ASTM D7415>3021.421.924.3FLUID DEGRADATIONMethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.918.318.4								
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25355SodiumppmASTM D5185m>20454PotassiumppmASTM D5185m>20021INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.910.3NitrationAbs/cm*ASTM D7624>209.810.110.0SulfationAbs/cm*ASTM D7415>3021.421.924.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/1mm*ASTM D7414>2517.918.318.4								
SiliconppmASTM D5185m>25355SodiumppmASTM D5185m>20454PotassiumppmASTM D5185m>20021INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.910.3NitrationAbs/cm*ASTM D7624>209.810.110.0SulfationAbs/tm*ASTM D7624>3021.421.924.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/tm*ASTM D7414>2517.918.318.4								
SodiumppmASTM D5185m4PotassiumppmASTM D5185m>20021INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.910.3NitrationAbs/cm*ASTM D7624>209.810.110.0SulfationAbs/.1mm*ASTM D7415>3021.421.924.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.918.318.4		CONTAMINAN	ITS	method	limit/base	current	history1	history2
PotassiumppmASTM D5185m>20021INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.910.3NitrationAbs/cm*ASTM D7624>209.810.110.0SulfationAbs/.1mm*ASTM D7415>3021.421.924.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.918.318.4			ppm		>25			
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>40.910.3NitrationAbs/cm*ASTM D7624>209.810.110.0SulfationAbs/lmm*ASTM D7415>3021.421.924.3FLUID DEGRADATION methodlimit/basecurrenthistory1history2OxidationAbs/lmm*ASTM D7414>2517.918.318.4			ppm					
Soot %       %       *ASTM D7844       >4       0.9       1       0.3         Nitration       Abs/cm       *ASTM D7624       >20       9.8       10.1       10.0         Sulfation       Abs/.1mm       *ASTM D7415       >30       21.4       21.9       24.3         FLUID DEGRADATION       method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       17.9       18.3       18.4		Potassium	ppm	ASTM D5185m	>20	0	2	1
Nitration       Abs/cm       *ASTM D7624       >20       9.8       10.1       10.0         Sulfation       Abs/.1mm       *ASTM D7415       >30       21.4       21.9       24.3         FLUID DEGRADATION       method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       17.9       18.3       18.4		INFRA-RED		method	limit/base	current	history1	history2
SulfationAbs/.1mm*ASTM D7415>3021.421.924.3FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.918.318.4		Soot %	%	*ASTM D7844	>4	0.9	1	0.3
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.918.318.4		Nitration	Abs/cm	*ASTM D7624	>20	9.8	10.1	10.0
Oxidation       Abs/.1mm       *ASTM D7414       >25       17.9       18.3       18.4		Sulfation	Abs/.1mm	*ASTM D7415	>30	21.4	21.9	24.3
		FLUID DEGRAI	DATION	method	limit/base	current	history1	history2



## **OIL ANALYSIS REPORT**



Mar22/23

Dec15/22

			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	
	Sep 9/23	Dec4/23 Feb23/24	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
	3	Feb De	Odor	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	13.9	13.8	
			GRAPHS							
			Ferrous Alloys							
			60 iron							
	Sep 9/23	Dec4/23	50 - chromium		· · · · · · · · · · · · · · · · · · ·					
			40							
			<u>۾</u> 30							
			20							
			10-		and all of the second sec					
			23 23	53 53	23	24				
			Dec15/22 Mar22/23	sep 9/23	Dec4/23	Feb23/24				
			□	2		LL.				
			copper							
			200 - tin							
			150-							
			<u>ڦ</u> 100							
			50-							
			0							
			Dec15/22 - Mar22/23 -	sep 9/23 .	Dec4/23 -	Feb23/24 -				
				2	Dei	Feb2				
			Viscosity @ 100°C	2			Base Number			
			18 - Abnormal		1		Base			
			16 Base			(b)	.0			
			© 15 -		<u> </u>	Q B 6	.0-			
						nber (r				
			Abnormal			4 N 2	.0			
			11			<sup>80</sup> 2	.0-			
			10							
			2/23	Sep 9/23 -	Dec4/23 -			un 15/23 - Sep 9/23 -	Dec4/23 -	
			Dec15/22 Mar22/23	Sep	Dect	Feb23/24	Dec15/22 Mar22/23	Jun15/23 Sep9/23	Dec4/23	
		l		M. Marster		. NO 07540			WD Hards and H	
Ø		Laboratory Sample No.	: WearCheck USA - 501 Madison Ave., Cary, NC 27513 GFL Environmental - 947 - WB Ho : GFL0104574 Received : 28 Feb 2024 N7296 Cour						- WB Horicon H 6 County Rd V	
	AB		r : 06103633		<b>Tested</b> : 29 Feb 2024			Horicon, W		
TESTING L	ABORATORY		<b>r</b> :10901863	Diagr	nosed : 29	9 Feb 2024 - <b>\</b>	Nes Davis		US 5303	
ertifica	ite L2367	Test Package	e : FLEET rt, contact Customer Serv			0			act: Tim Kieffe	
P			n contact Luctomer Serv	ure at 1-8	いい-ンスノ-1.36	ч		tim kieft	er@gflenv.cor	

Submitted By: See also GFL935 - Tim Kieffer