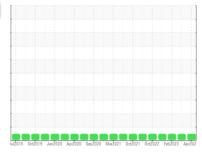


# **OIL ANALYSIS REPORT**

Sample Rating Trend







Machine Id
2526
Component
Diesel Engine

# PETRO CANADA DURON HP 15W40 (--- QTS)

### Recommendation

Resample at the next service interval to monitor.

### Wear

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the oil.

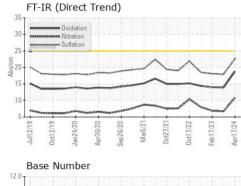
## **Fluid Condition**

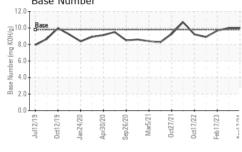
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

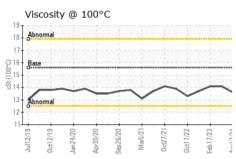
SAMPLE INFORMATION   method   limit/bass   current   history1   history2	13)		1012019 001201	19 Janzuzu Aprzuzu Sepzi	uzu marzuzi uetzuzi uetzuzz Fi	10ZUZ3 AprZUZ		
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2	
Sample Date         Client Info         17 Apr 2024         11 Apr 2023         17 Feb 2023           Machine Age         hrs         Client Info         10837         8965         8688           Oil Age         hrs         Client Info         210         300         220           Oil Changed         Client Info         Changed         Chan	Sample Number		Client Info		RW0005553	RW0004349	RW0004201	
Machine Age         hrs         Client Info         10837         8965         8668           Oil Age         hrs         Client Info         210         300         220           Oil Changed         Client Info         Changed Cha			Client Info		17 Apr 2024	11 Apr 2023	17 Feb 2023	
Oil Changed Sample Status         Client Info         Changed NORMAL         Changed NoRMAC         Changed NoRMAC         Changed NoRMAC         Changed NoRMAC         Changed NoRMAC         Changed NoRMAC         Changed NoRMAC         Changed NoRMAC         Change NEG	Machine Age	hrs	Client Info		-		8668	
Oil Changed Sample Status         Client Info         Changed NORMAL         NORMAL <th< th=""><th>Oil Age</th><th>hrs</th><th>Client Info</th><th></th><th>210</th><th>300</th><th>220</th></th<>	Oil Age	hrs	Client Info		210	300	220	
NORMAL   NORMAL   NORMAL	-		Client Info		Changed	Changed	Changed	
Fuel					_		_	
Water Glycol         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         12         12         12         12           Chromium         ppm         ASTM D5185m         >20         1         0         0           Nickel         ppm         ASTM D5185m         >4         <1	CONTAMINATIC	N	method	limit/base	current	history1	history2	
Second   WC Method   NEG   NEG   NEG	Fuel		WC Method	>5	<1.0	<1.0	<1.0	
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium         ppm         ASTM D5185m         >20         1         0         0           Nickel         ppm         ASTM D5185m         >4         <1         0         0           Titanium         ppm         ASTM D5185m         >3         <1         0         0           Silver         ppm         ASTM D5185m         >3         <1         0         0           Aluminum         ppm         ASTM D5185m         >3         <1         <1         1           Lead         ppm         ASTM D5185m         >40         1         0         0         0           Copper         ppm         ASTM D5185m         >40         1         0         0         0           Tin         ppm         ASTM D5185m         >15         1         0         0         0           Vanadium         ppm         ASTM D5185m         <1         0         0         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0         0         0         0         0 <th>WEAR METALS</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	WEAR METALS		method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>100	12	12	12	
Titanium         ppm         ASTM D5185m         <1	Chromium	ppm	ASTM D5185m	>20	1	0	0	
Silver         ppm         ASTM D5185m         >3         <1	Nickel	ppm	ASTM D5185m	>4	<1	0	0	
Aluminum	Titanium	ppm	ASTM D5185m		<1	0	0	
Lead         ppm         ASTM D5185m         >40         1         0         0           Copper         ppm         ASTM D5185m         >330         1         0         0           Tin         ppm         ASTM D5185m         >15         1         0         0           Vanadium         ppm         ASTM D5185m         <1	Silver	ppm	ASTM D5185m	>3	<1	0	0	
Copper         ppm         ASTM D5185m         >330         1         0         0           Tin         ppm         ASTM D5185m         >15         1         0         0           Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         41         2         3           Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         55         58         58           Manganese         ppm         ASTM D5185m         -1	Aluminum	ppm	ASTM D5185m	>20	3	<1	<1	
Tin         ppm         ASTM D5185m         >15         1         0         0           Vanadium         ppm         ASTM D5185m         <1	Lead	ppm	ASTM D5185m	>40	1	0	0	
Vanadium         ppm         ASTM D5185m         <1	Copper	ppm	ASTM D5185m	>330	1	0	0	
Cadmium         ppm         ASTM D5185m         <1	Tin	ppm	ASTM D5185m	>15	1	0	0	
ADDITIVES	Vanadium	ppm	ASTM D5185m		<1	0	0	
Boron	Cadmium	ppm	ASTM D5185m		<1	0	0	
Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         55         58         58           Manganese         ppm         ASTM D5185m         -1         -1         -1           Magnesium         ppm         ASTM D5185m         749         868         885           Calcium         ppm         ASTM D5185m         1191         993         1085           Phosphorus         ppm         ASTM D5185m         767         931         938           Zinc         ppm         ASTM D5185m         876         1172         1135           Sulfur         ppm         ASTM D5185m         2451         3159         3264           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         "ASTM D7844         >3 <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum         ppm         ASTM D5185m         55         58         58           Manganese         ppm         ASTM D5185m         <1	Boron	ppm	ASTM D5185m		41	2	3	
Manganese         ppm         ASTM D5185m         <1	<th>Barium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th>0</th> <th>0</th>	Barium	ppm	ASTM D5185m		0	0	0
Magnesium         ppm         ASTM D5185m         749         868         885           Calcium         ppm         ASTM D5185m         1191         993         1085           Phosphorus         ppm         ASTM D5185m         767         931         938           Zinc         ppm         ASTM D5185m         876         1172         1135           Sulfur         ppm         ASTM D5185m         2451         3159         3264           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         "ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         "ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         "ASTM D7415         >30         22.6         17.9         18.1 <td colspan<="" th=""><th>Molybdenum</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>55</th><th>58</th><th>58</th></td>	<th>Molybdenum</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>55</th> <th>58</th> <th>58</th>	Molybdenum	ppm	ASTM D5185m		55	58	58
Calcium         ppm         ASTM D5185m         1191         993         1085           Phosphorus         ppm         ASTM D5185m         767         931         938           Zinc         ppm         ASTM D5185m         876         1172         1135           Sulfur         ppm         ASTM D5185m         2451         3159         3264           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2<	Manganese	ppm	ASTM D5185m		<1	<1	<1	
Phosphorus         ppm         ASTM D5185m         767         931         938           Zinc         ppm         ASTM D5185m         876         1172         1135           Sulfur         ppm         ASTM D5185m         2451         3159         3264           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8 <th>Magnesium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>749</th> <th>868</th> <th>885</th>	Magnesium	ppm	ASTM D5185m		749	868	885	
Zinc         ppm         ASTM D5185m         876         1172         1135           Sulfur         ppm         ASTM D5185m         2451         3159         3264           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0	Calcium	ppm	ASTM D5185m		1191	993	1085	
Sulfur         ppm         ASTM D5185m         2451         3159         3264           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0	Phosphorus	ppm			767	931	938	
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0		ppm	ASTM D5185m		876	1172	1135	
Silicon         ppm         ASTM D5185m         >25         6         3         3           Sodium         ppm         ASTM D5185m         3         1         <1	Sulfur	ppm	ASTM D5185m		2451	3159	3264	
Sodium         ppm         ASTM D5185m         3         1         <1	CONTAMINANTS	S	method	limit/base	current	history1	history2	
Potassium         ppm         ASTM D5185m         >20         4         0         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0	Silicon	ppm	ASTM D5185m	>25	6	3	3	
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0	Sodium	ppm	ASTM D5185m		3	1	<1	
Soot %         %         *ASTM D7844 >3         1.2         0.3         0.2           Nitration         Abs/cm         *ASTM D7624 >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415 >30         22.6         17.9         18.1           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         18.8         13.9         14.0	Potassium	ppm	ASTM D5185m	>20	4	0	2	
Nitration         Abs/cm         *ASTM D7624         >20         10.8         6.7         6.9           Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation         Abs/.1mm         *ASTM D7415         >30         22.6         17.9         18.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         18.8         13.9         14.0	Soot %	%	*ASTM D7844	>3	1.2	0.3	0.2	
FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 18.8 13.9 14.0	Nitration	Abs/cm	*ASTM D7624	>20	10.8	6.7	6.9	
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30	22.6	17.9	18.1	
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2	
Base Number (BN)         mg KOH/g         ASTM D2896         9.8         9.98         9.97         9.67	Oxidation	Abs/.1mm	*ASTM D7414	>25	18.8	13.9	14.0	
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	9.98	9.97	9.67	



# **OIL ANALYSIS REPORT**





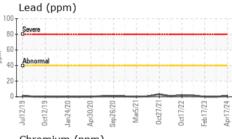


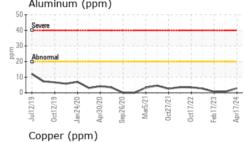
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

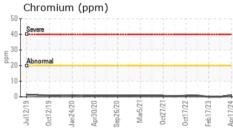
I LOID I HOI LI	TILO	memou			Thistory i	HISTOLYZ
Visc @ 100°C	cSt	ASTM D445	15.6	13.6	14.1	14.09

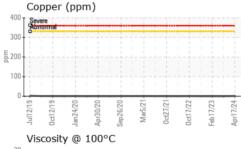
Iro 250 <del>-</del>	n (pp	om)								
200 - Sev	ere									
150										
E	ormal			-				1		6
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0	-	+	-		-	_	_	$\rightarrow$	=	
Jul12/19	0ct12/19	Jan24/20	Apr30/20	Sep26/20	Mar5/2	Oct27/2	0ct17/22	Feb17/23	Apr17/24	
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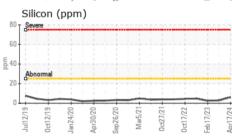
**GRAPHS** 

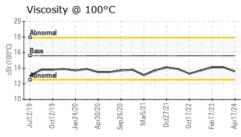


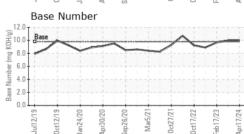
















Certificate 12367

Laboratory Sample No.

Lab Number : 06184537 Unique Number : 11035863

: RW0005553 Test Package : MOB 2

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 20 May 2024 **Tested** : 21 May 2024

Diagnosed

: 22 May 2024 - Sean Felton To discuss this sample report, contact Customer Service at 1-800-237-1369.

Contact: ERIC KING

ewking@newkirk-electric.com T: (231)206-6131

**NEWKIRK ELECTRIC** 

1875 ROBERTS ST.

MUSKEGON, MI

F: (231)724-4090

US 49442

\* - 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)

Report Id: NEWMUS [WUSCAR] 06184537 (Generated: 05/22/2024 14:46:32) Rev: 1

Contact/Location: ERIC KING - NEWMUS