

# **OIL ANALYSIS REPORT**

# Sample Rating Trend





# Machine Id 712016 MACK LR64

Component **Diesel Engine** 

PETRO CANADA DURON SHP 15W40 (48 QTS)

# DIAGNOSIS

## Recommendation

Resample at the next service interval to monitor.

#### Wear

Metal levels are typical for a new component breaking in.

## Contamination

There is no indication of any contamination in the oil.

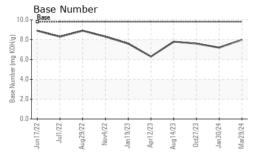
## **Fluid Condition**

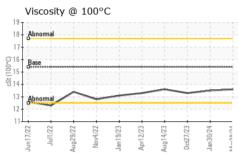
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Client Info   Client Info   Cample Number   Client Info   Client Info   Client Info   Client Info   Sample Date   Client Info   S772   S252   4511   S20   Af 1   607   Af 1	N SHP 15W40 (48	B QTS)	Jun2022 Jul2	022 Aug2022 Nov2022 Jan2	023 Apr2023 Aug2023 Oct2023 Jan2	024 Mar2024	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age	Sample Number		Client Info		GFL0103230	GFL0103175	GFL009467
Dil Age	Sample Date		Client Info		29 Mar 2024	30 Jan 2024	27 Oct 2023
Client Info	Machine Age	hrs	Client Info		5772	5252	4511
NORMAL   NORMAL   NORMAL   NORMAL   CONTAMINATION   method   imit/base   current   history1   history2   history3   history4   history4   history4   history5   his	Oil Age	hrs	Client Info		520	741	607
CONTAMINATION   method   limit/base   current   history1   history2	Oil Changed		Client Info		Changed	Changed	Changed
Water	Sample Status				NORMAL	NORMAL	NORMAL
Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         >120         4         8         8           Chromium         ppm         ASTM D5185m         >20         0         <1         <1           Vickel         ppm         ASTM D5185m         >5         1         2         <1           Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >40         0         <1         0           Copper         ppm         ASTM D5185m         >40         0         <1         1         1           Vanadium         ppm         ASTM D5185m         >15         <1         1         1         1           Vanadium         ppm         ASTM D5185m         0         5         2         3	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >120         4         8         8           Chromium         ppm         ASTM D5185m         >20         0         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Secondary   Part   Pa	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	ron	ppm	ASTM D5185m	>120	4	8	8
Titanium	Chromium	ppm	ASTM D5185m	>20	0	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>5	1	2	<1
Aluminum	Titanium	ppm	ASTM D5185m	>2	0	<1	0
Lead	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper         ppm         ASTM D5185m         >330         <1         <1         1           Tin         ppm         ASTM D5185m         >15         <1	Aluminum	ppm	ASTM D5185m	>20	2	2	<1
Tin	Lead	ppm	ASTM D5185m	>40	0	<1	0
Vanadium         ppm         ASTM D5185m         0         <1         0           Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         5         2         3           Barium         ppm         ASTM D5185m         0         0         0         19           Molybdenum         ppm         ASTM D5185m         0         0         0         19           Molybdenum         ppm         ASTM D5185m         0         <1         <1         <1           Manganese         ppm         ASTM D5185m         0         <1         <1         <1         <1           Magnesium         ppm         ASTM D5185m         1010         941         978         882           Calcium         ppm         ASTM D5185m         1070         1044         1057         982           Phosphorus         ppm         ASTM D5185m         1270         1236         1200         1131           Sulfur         ppm         ASTM D5185m         2060         3370	Copper	ppm	ASTM D5185m	>330	<1	<1	1
Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         5         2         3           Barium         ppm         ASTM D5185m         0         0         0         19           Molybdenum         ppm         ASTM D5185m         0         <1	Tin	ppm	ASTM D5185m	>15	<1	1	1
ADDITIVES	Vanadium	ppm	ASTM D5185m		0	<1	0
Boron	Cadmium	ppm	ASTM D5185m		0	<1	0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         58         55         61           Manganese         ppm         ASTM D5185m         0         <1	Boron	ppm	ASTM D5185m	0	5	2	3
Manganese         ppm         ASTM D5185m         0         <1         <1         <1           Magnesium         ppm         ASTM D5185m         1010         941         978         882           Calcium         ppm         ASTM D5185m         1070         1044         1057         982           Phosphorus         ppm         ASTM D5185m         1150         1018         988         927           Zinc         ppm         ASTM D5185m         1270         1236         1200         1131           Sulfur         ppm         ASTM D5185m         2060         3370         2767         3595           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D	Barium	ppm	ASTM D5185m	0	0	0	19
Magnesium         ppm         ASTM D5185m         1010         941         978         882           Calcium         ppm         ASTM D5185m         1070         1044         1057         982           Phosphorus         ppm         ASTM D5185m         1150         1018         988         927           Zinc         ppm         ASTM D5185m         1270         1236         1200         1131           Sulfur         ppm         ASTM D5185m         2060         3370         2767         3595           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm	Molybdenum	ppm	ASTM D5185m	60	58	55	61
Calcium         ppm         ASTM D5185m         1070         1044         1057         982           Phosphorus         ppm         ASTM D5185m         1150         1018         988         927           Zinc         ppm         ASTM D5185m         1270         1236         1200         1131           Sulfur         ppm         ASTM D5185m         2060         3370         2767         3595           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         1         1         4         4           Potassium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D74	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus         ppm         ASTM D5185m         1150         1018         988         927           Zinc         ppm         ASTM D5185m         1270         1236         1200         1131           Sulfur         ppm         ASTM D5185m         2060         3370         2767         3595           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1	Magnesium	ppm	ASTM D5185m	1010	941	978	882
Zinc   ppm   ASTM D5185m   1270   1236   1200   1131     Sulfur   ppm   ASTM D5185m   2060   3370   2767   3595     CONTAMINANTS   method   limit/base   current   history1   history2     Silicon   ppm   ASTM D5185m   >25   4   4   4     Sodium   ppm   ASTM D5185m   1   1   4     Potassium   ppm   ASTM D5185m   >20   1   4   5     INFRA-RED   method   limit/base   current   history1   history2     Soot %   "ASTM D7844   >4   0.2   0.3   0.3     Nitration   Abs/cm   "ASTM D7624   >20   7.2   8.1   7.4     Sulfation   Abs/.1mm   "ASTM D7415   >30   18.7   19.6   18.8     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   "ASTM D7414   >25   14.6   15.6   14.8	Calcium	ppm	ASTM D5185m	1070	1044	1057	982
Sulfur         ppm         ASTM D5185m         2060         3370         2767         3595           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         1         1         4         4           Potassium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	Phosphorus	ppm	ASTM D5185m	1150	1018	988	927
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         1         1         4           Potassium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	Zinc	ppm	ASTM D5185m	1270	1236	1200	1131
Silicon         ppm         ASTM D5185m         >25         4         4         4           Sodium         ppm         ASTM D5185m         1         1         4           Potassium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	Sulfur	ppm	ASTM D5185m	2060	3370	2767	3595
Sodium         ppm         ASTM D5185m         1         1         4           Potassium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         1         4         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	Silicon	ppm		>25			
INFRA-RED		ppm					
Soot %         %         *ASTM D7844         >4         0.2         0.3         0.3           Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	Potassium	ppm	ASTM D5185m	>20	1	4	5
Nitration         Abs/cm         *ASTM D7624         >20         7.2         8.1         7.4           Sulfation         Abs/.1mm         *ASTM D7615         >30         18.7         19.6         18.8           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         18.7         19.6         18.8           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         14.6         15.6         14.8	Soot %	%	*ASTM D7844	>4	0.2	0.3	0.3
FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 14.6 15.6 14.8	Nitration	Abs/cm	*ASTM D7624	>20	7.2	8.1	7.4
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.7	19.6	18.8
	FLUID DEGRAD	OATION	method	limit/base	current	history1	history2
Base Number (BN)         mg KOH/g         ASTM D2896         9.8         8.0         7.2         7.6	Oxidation	Abs/.1mm	*ASTM D7414	>25	14.6	15.6	14.8
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	8.0	7.2	7.6



# **OIL ANALYSIS REPORT**

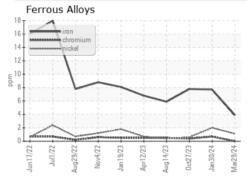


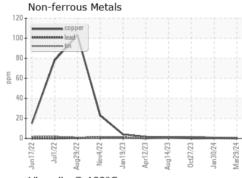


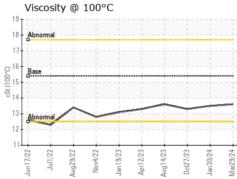
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
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

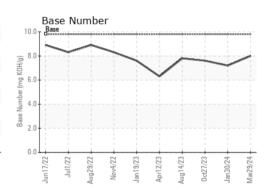
FLUID PROPE	ERTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	15.4	13.6	13.5	13.3

## **GRAPHS**













Certificate L2367

Laboratory Sample No.

: GFL0103230 Lab Number : 06137053 Unique Number: 10956518

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

Received **Tested** Diagnosed

: 03 Apr 2024 : 03 Apr 2024 : 03 Apr 2024 - Wes Davis

GFL Environmental - 001 - Raleigh(CNG) 3741 Conquest Drive

Garner, NC US 27529 Contact: Craig Johnson

Test Package : FLEET 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.

craig.johnson@gflenv.com T: (919)662-7100 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: (919)662-7130

Submitted By: aka Keith - Ronald Gregory