

OIL ANALYSIS REPORT

Sample Rating Trend

<u>.</u>





Component

Diesel Engine

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

DIAGNOSIS

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.

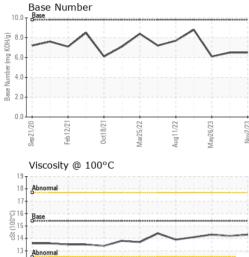
SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0098200	GFL0083884	GFL0061469
Sample Date		Client Info		02 Nov 2023	05 Oct 2023	26 May 2023
Machine Age	hrs	Client Info		13425	13222	5002
Oil Age	hrs	Client Info		5205	13222	5002
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>110	57	55	47
Chromium	ppm	ASTM D5185m	>4	2	2	2
Nickel	ppm	ASTM D5185m	>2	<1	<1	<1
Titanium	ppm	ASTM D5185m		<1	0	<1
Silver	ppm	ASTM D5185m	>2	<1	0	<1
Aluminum	ppm	ASTM D5185m	>25	4	0	2
Lead	ppm	ASTM D5185m	>45	8	5	2
Copper	ppm	ASTM D5185m	>85	3	3	7
Tin	ppm	ASTM D5185m	>4	1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	0	0
Cadmium	ppm	ASTM D5185m		<1	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 10	history1 5	history2 17
	ppm ppm	ASTM D5185m				
Boron		ASTM D5185m	0	10	5	17
Boron Barium	ppm	ASTM D5185m ASTM D5185m	0 0 60	10 0	5 0	17 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60	10 0 62	5 0 63	17 0 67
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0	10 0 62 <1	5 0 63 <1	17 0 67 1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010	10 0 62 <1 965	5 0 63 <1 980	17 0 67 1 987
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070	10 0 62 <1 965 1121	5 0 63 <1 980 1115	17 0 67 1 987 1203
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150	10 0 62 <1 965 1121 1020	5 0 63 <1 980 1115 1067	17 0 67 1 987 1203 1050
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270	10 0 62 <1 965 1121 1020 1342	5 0 63 <1 980 1115 1067 1333	17 0 67 1 987 1203 1050 1294
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	10 0 62 <1 965 1121 1020 1342 2950	5 0 63 <1 980 1115 1067 1333 3028	17 0 67 1 987 1203 1050 1294 3332
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 60 0 1010 1070 1150 1270 2060	10 0 62 <1 965 1121 1020 1342 2950 current	5 0 63 <1 980 1115 1067 1333 3028 history1	17 0 67 1 987 1203 1050 1294 3332 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 Limit/base >30	10 0 62 <1 965 1121 1020 1342 2950 current 8	5 0 63 <1 980 1115 1067 1333 3028 history1 8	17 0 67 1 987 1203 1050 1294 3332 history2 11
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	0 0 60 1010 1070 1150 1270 2060 Limit/base >30	10 0 62 <1 965 1121 1020 1342 2950 current 8 3 4	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0	17 0 67 1 987 1203 1050 1294 3332 history2 11 5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 Iinit/base >30 -20 Iinit/base	10 0 62 <1 965 1121 1020 1342 2950 current 8 3 4 2	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0 6 Kistory1	17 0 67 1 987 1203 1050 1294 3332 history2 11 5 3 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 Imit/base >30 20 Imit/base	10 0 62 <1 965 1121 1020 1342 2950 <u>current</u> 8 3 4 <u>current</u>	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0 6 <u>history1</u> 2.7	17 0 67 1 987 1203 1050 1294 3332 history2 11 5 3 3 history2 2.5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >30 >20 limit/base >3 >20	10 0 62 <1 965 1121 1020 1342 2950 current 8 3 4 2	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0 6 Kistory1	17 0 67 1 987 1203 1050 1294 3332 history2 11 5 3 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	0 0 0 1010 1070 1150 1270 2060 limit/base >30 >20 limit/base >3 >20	10 0 62 <1 965 1121 1020 1342 2950 <u>current</u> 8 3 4 <u>current</u> 2.5 10.8 25.3	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0 6 <u>history1</u> 2.7 10.4	17 0 67 1 987 1203 1050 1294 3332 history2 11 5 3 history2 2.5 9.1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844	0 0 0 1010 1070 1150 1270 2060 i mit/base >30 220 i mit/base >3 >20 >30	10 0 62 <1 965 1121 1020 1342 2950 Current 8 3 4 Current 2.5 10.8 25.3 Current	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0 6 history1 2.7 10.4 24.5 history1	17 0 67 1 987 1203 1050 1294 3332 history2 11 5 3 <i>history2</i> 2.5 9.1 23.2 <i>history2</i>
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7415	0 0 0 1010 1070 1150 1270 2060 imit/base >30 imit/base >3 >20 imit/base >3 >20	10 0 62 <1 965 1121 1020 1342 2950 <u>current</u> 8 3 4 <u>current</u> 2.5 10.8 25.3	5 0 63 <1 980 1115 1067 1333 3028 history1 8 0 6 6 history1 2.7 10.4 24.5	17 0 67 1 987 1203 1050 1294 3332 history2 11 5 3 3 <u>history2</u> 2.5 9.1 23.2



12 11 Sep21/20

Feb12/21

OIL ANALYSIS REPORT



Aug11/22

Mar25/22

	VISUAL		method	limit/base	current	history1	history2
$\boldsymbol{\lambda}$	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
5/23		scalar	*Visual	NORML	NORML	NORML	NORML
May26/23 Nov2/23	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	14.3	14.2	14.3
	GRAPHS						
	Ferrous Alloys						
6/23	50 - iron		/	-			
May26/23	40+		1				
	튭 30-						
	20	/					
	Sep 21/20 Feb 12/21 Oct18/21	Mar25/22	Aug 11/22 May 26/23	Nov2/23			
		1000	Auc	Nć			
	Non-ferrous Metal	S					
	copper						
	economic tin						
	25						
	₽ ²⁰						
		1					
	10						
		5	->	\leq			
	20 JO	/22	/22 /23	123			
	Sep21/20 Feb12/21	Mar25/22	Aug 11/22 Vlay 26/23	Nov2/23			
	Viscosity @ 100°C				Base Number		
	¹⁹			10.0			
	18 - Abnormal						\wedge
	17-			0.8 0.0 0.0 8 8 8 8 9 0.4 0 0 4.0	\sim		- \
	Color Base		****	у В 6.0	· · · · · · · · · · · · · · · · · · ·		
	016 Base 15 3 14	\sim		Langun 4.0			
		_		N as			
	13 Abnormal			⁶⁶ 2.0			
	11						
	Sep21/20	Mar25/22 -	Aug 11/22 - May26/23 -	Nov2/23	Sep21/20	5/22 -	Aug 11/22 - May26/23 - Nov2/23 -
	Sep2 Feb1	Mar2	Aug11/22 May26/23	Nov	Sep2 Feb1	Mar25/22	Aug11/22 May26/23 Nov2/23
charateri	· MoorChook LICA			NO OZETO		nmontal 650	
aboratory	: WearCheck USA - 5 : GFL0098200	Received		ry, NC 2751: Nov 2023	GFL ENVIRO		Fredericksburg Hauling 954 Houser Drive
ab Number		Diagnos		Nov 2023			redericksburg, VA
Inique Numbe		Diagnoet		e Davie			115 22408



: 06 Nov 2023 Fredericksburg, VA Diagnosed Diagnostician : Wes Davis US 22408 Contact: WILLIAM MILO To discuss this sample report, contact Customer Service at 1-800-237-1369. wmilo@gflenv.com * - 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)

Certificate L2367

Unique Number : 10726700

Test Package : FLEET

T:

F: