

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Machine Id MACK 2655

Component Diesel Engine Fluid

PETRO CANADA DURON SHP 15W40 (7 GAL)

Sample Number Client Info GFL0086214 GFL0087566 GFL00877 Sample Date in Client Info 30660 30660 29807 Machine Age hrs Client Info 30660 30670 0 29807 Oil Age ins Client Info 30660 30670 0 29807 Oil Changed Client Info N/A N/A N/A Changed SEVERE SEVER	DN SHP 15W40 (7 GAL)											
Sample Date Client Into 12 Sep 2023 28 Jun 2023 12 Jan 20 Machine Age hrs Client Info 30660 30660 29807 Oil Age hirs Client Info 30670 0 29807 Oil Changed Client Info N/A N/A Changed SEVERE SEVERE CONTAMINATION method imit/base current history1 history1 Glycol WC Method NEG NEG NEG WEAR METALS method imit/base current history1 history1 Kron ppm ASTM D5185m >20 1 0 <1 Nickel ppm ASTM D5185m >20 6 <1 <1 Titanium ppm ASTM D5185m >20 6 <1 <1 Lead ppm ASTM D5185m >20 6 <1 <1 Copper pm ASTM D5185m >20 6 <1 <1	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2					
Machine Age hrs Client Info 30660 30660 29807 Oil Age hrs Client Info S0670 0 29807 Oil Age hrs Client Info N/A N/A Clanged Sample Status Imit/base current history1 history1 GONTAMINATION method Imit/base current history1 history1 Formium ppm ASTM D5185m >120 67 20 11 Chromium ppm ASTM D5185m >20 0 0 <1	Sample Number		Client Info		GFL0086214	GFL0057566	GFL0057581					
Dil Age hrs. Client Info 30670 0 29807 Dil Changed Client Info N/A N/A N/A Changed Sample Status Imit/base current history1 history1 Glycol WC Method NEG NEG NEG WEAR METALS method Imit/base current history1 history1 Iron ppm ASTM D5185m >20 1 0 -1 1 Chromium ppm ASTM D5185m >20 1 0 -1 1 Kickel ppm ASTM D5185m >2 <1	Sample Date		Client Info		12 Sep 2023	28 Jun 2023	12 Jan 2023					
Dil Changed Client Info N/A N/A Changed Sample Status Client Info N/A NCRMAL SEVERE SEVERE CONTAMINATION method limit/base current history1 history1 Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Kron ppm ASTM D5185m >20 1 0 <1	Machine Age	hrs	Client Info		30660	30660	29807					
Sample Status NORMAL SEVERE SEVERE SEVERE CONTAMINATION method limit/base current history1 history1 Glycol WC Method NEG NEG NEG VEAR METALS method limit/base current history1 history1 for ppm ASTM D5185m >120 67 20 1 Chromium ppm ASTM D5185m >5 0 <1	Oil Age	hrs	Client Info		30670	0	29807					
CONTAMINATION method limit/base current history1 histor Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 histor Iron ppm ASTM D5185m >120 67 20 11 0 Chromium ppm ASTM D5185m >20 1 0 1 1 Chromium ppm ASTM D5185m >2 <1	Oil Changed		Client Info		N/A	N/A	Changed					
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history1 Iron ppm ASTM D5185m >120 67 20 11 Chromium ppm ASTM D5185m >20 1 0 <1	Sample Status				NORMAL	SEVERE	SEVERE					
WEAR METALS method limit/base current history1 history1 Iron ppm ASTM 05185m >120 67 20 11 Chromium ppm ASTM 05185m >20 1 0 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2					
Iron ppm ASTM D5185m >120 67 20 11 Chromium ppm ASTM D5185m >20 1 0 <1	Glycol		WC Method		NEG	NEG	NEG					
Chromium ppm ASTM D5185m >20 1 0 <1 Nickel ppm ASTM D5185m >5 0 <1	WEAR METAL	S	method	limit/base	current	history1	history2					
Nickel ppm ASTM D5185m >5 0 <1 1 Titanium ppm ASTM D5185m >2 <1	Iron	ppm	ASTM D5185m	>120	67	20	11					
Nickel ppm ASTM D5185m >5 0 <1 1 Titanium ppm ASTM D5185m >2 <1	Chromium		ASTM D5185m	>20	1	0	<1					
Titanium ppm ASTM D5185m >2 <1 <1 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 6 <1	Nickel				0	<1	1					
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 6 <1	Titanium		ASTM D5185m	>2		<1	0					
Aluminum ppm ASTM D5185m >20 6 <1 <1 Lead ppm ASTM D5185m >40 0 0 <1	Silver	ppm	ASTM D5185m	>2	0	0	0					
Lead ppm ASTM D5185m >40 0 0 <1 Copper ppm ASTM D5185m >330 6 22 11 Tin ppm ASTM D5185m >15 <1			ASTM D5185m	>20	6	<1	<1					
Copper ppm ASTM D5185m >330 6 22 11 Tin ppm ASTM D5185m >15 <1												
Tin ppm ASTM D5185m >15 <1 2 2 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 13 <1	Copper					22						
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 13 <1												
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history1 Boron ppm ASTM D5185m 0 13 <1 3 Barium ppm ASTM D5185m 0 0 14 0 Molybdenum ppm ASTM D5185m 0 <1 <1 3 Magnesium ppm ASTM D5185m 0 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 0 <1 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 736 343 360 Calcium ppm ASTM D5185m 1070 1082 427 538 Phosphorus ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base <td></td> <td></td> <td></td> <td></td> <th></th> <td></td> <td></td>												
Boron ppm ASTM D5185m 0 13 <1 3 Barium ppm ASTM D5185m 0 0 14 0 Molybdenum ppm ASTM D5185m 60 59 26 30 Manganese ppm ASTM D5185m 0 <1												
Barium ppm ASTM D5185m 0 0 14 0 Molybdenum ppm ASTM D5185m 60 59 26 30 Manganese ppm ASTM D5185m 0 <1	ADDITIVES		method	limit/base	current	history1	history2					
Molybdenum ppm ASTM D5185m 60 59 26 30 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	0	13	<1	3					
Manganese ppm ASTM D5185m 0 <1 <1 <1 Magnesium ppm ASTM D5185m 1010 736 343 360 Calcium ppm ASTM D5185m 1070 1082 427 538 Phosphorus ppm ASTM D5185m 1150 885 419 473 Zinc ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >20 1 <1	Barium	ppm	ASTM D5185m	0	0	14	0					
Magnesium ppm ASTM D5185m 1010 736 343 360 Calcium ppm ASTM D5185m 1070 1082 427 538 Phosphorus ppm ASTM D5185m 1150 885 419 473 Zinc ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >20 1 <1	Molybdenum	ppm	ASTM D5185m	60	59	26	30					
Calcium ppm ASTM D5185m 1070 1082 427 538 Phosphorus ppm ASTM D5185m 1150 885 419 473 Zinc ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 histor Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >20 1 <1	Manganese	ppm	ASTM D5185m	0	<1	<1	<1					
Calcium ppm ASTM D5185m 1070 1082 427 538 Phosphorus ppm ASTM D5185m 1150 885 419 473 Zinc ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m 225 4 6 4 Sodium ppm ASTM D5185m 220 1 <1	Magnesium	ppm	ASTM D5185m	1010	736	343	360					
Zinc ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 histor Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m 224 3 <1	-	ppm	ASTM D5185m	1070	1082	427	538					
Zinc ppm ASTM D5185m 1270 1102 504 541 Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >20 1 <1	Phosphorus	ppm	ASTM D5185m	1150	885	419	473					
Sulfur ppm ASTM D5185m 2060 3080 1275 1350 CONTAMINANTS method limit/base current history1 history1 Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m >20 1 <1 0 Potassium ppm ASTM D5185m >20 1 <1 0 Fuel % ASTM D5185m >20 1 <1 0 Soot % % ASTM D7844 >3.0 0.3 54.1 42.8 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7624 >20 7.0 9.4 7.8 Sulfation Abs/.mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base curre			ASTM D5185m	1270	1102	504	541					
Silicon ppm ASTM D5185m >25 4 6 4 Sodium ppm ASTM D5185m 24 3 <1	Sulfur		ASTM D5185m		3080		1350					
Sodium ppm ASTM D5185m 24 3 <1 Potassium ppm ASTM D5185m<>20 1 <1	CONTAMINAN	TS	method	limit/base	current	history1	history2					
Potassium ppm ASTM D5185m >20 1 <1 0 Fuel % ASTM D3524 >3.0 0.3 54.1 42.8 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >4 0.9 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.0 9.4 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	Silicon	ppm	ASTM D5185m	>25	4	6	4					
Fuel % ASTM D3524 >3.0 0.3 54.1 42.8 INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >4 0.9 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.0 9.4 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	Sodium	ppm	ASTM D5185m		24	3	<1					
INFRA-RED method limit/base current history1 history1 Soot % % *ASTM D7844 >4 0.9 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.0 9.4 7.8 Sulfation Abs/.tmm *ASTM D7624 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.tmm *ASTM D7414 >25 12.0 13.6 11.2	Potassium	ppm	ASTM D5185m	>20	1	<1	0					
Soot % % *ASTM D7844 >4 0.9 0.2 0.2 Nitration Abs/cm *ASTM D7624 >20 7.0 9.4 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	Fuel	%	ASTM D3524	>3.0	0.3	5 4.1	42.8					
Nitration Abs/cm *ASTM D7624 >20 7.0 9.4 7.8 Sulfation Abs/.1mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	INFRA-RED		method	limit/base	current	history1	history2					
Sulfation Abs/.1mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	Soot %	%	*ASTM D7844	>4	0.9	0.2	0.2					
Sulfation Abs/.1mm *ASTM D7415 >30 17.8 17.2 15.8 FLUID DEGRADATION method limit/base current history1 history1 Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	Nitration	Abs/cm	*ASTM D7624	>20		9.4	7.8					
Oxidation Abs/.1mm *ASTM D7414 >25 12.0 13.6 11.2	Sulfation											
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2					
Rase Number (RN) mak/0H/a ASTM D2806 Q 8 77 ▲ 37 5 1	Oxidation	Abs/.1mm	*ASTM D7414	>25	12.0	13.6	11.2					
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	7.7	▲ 3.7	5.1					

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Fuel content negligible. 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.

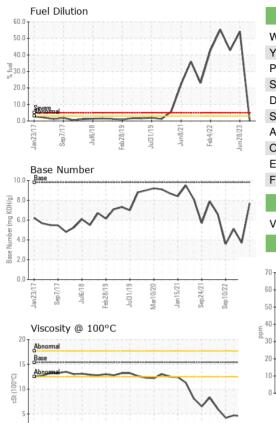


0. Jan23/17 -

Sep7/17.

Jul6/18

OIL ANALYSIS REPORT



-eb28/19

	VISUAL		method	limit/base	current	history1	history2
$\wedge 1$	White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
$\wedge/$	Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
/ V	Silt	scalar	*Visual	NONE	NONE	NONE	NONE
	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Feb28/19 Jul31/19 Jun8/21 Feb4/22 Jun28/23	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Febû Julî Fek	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	12.9	4.54	4.7
W	GRAPHS						
	Ferrous Alloys						
	70	THE STATE	anan				
Heb.28/19 Jul31/19 Jan15/21 Sep24/21 Sep10/22	60 - chromium			111			
Jul'Iun Jan Marian Sep	50 -						
°C	E 40						
	80- 30-						
	20-		A /				
	10	N	$\wedge N$	V			
	0	- Antimat		Lines 1			
\sim	Jan 23/17 Sep 7/17 Jul6/18 Feb 28/19	Jul31/19	Jan 15/21 Sep 24/21	2/23 -			
\sim	Jan2 Sep Jul	Jul3 Mar1	Jan 15/21 Sep 24/21 Sep 10/22	Sep 12/23			
	Non-ferrous Metals	5					
Jul31/19 Jan10/20 Sep24/21 Sep10/22	120 copper]						
Jul Jul Jan Mar Sep Sep	100						
	80	H.H.H.	LE LA LE				
			- A -				
	튭 60 -						
	40 -		$\Lambda $				
	20			Δ			
	0	\sim					
	Jan 23/17 Sep 7/17 Jul6/18	Jul31/19	Jan 15/21- Sep 24/21- Sep 10/22 -	Sep12/23			
	Jan; Seg Ju Feb2	Jul. Marl	Jan Sep.1	Sep			
	Viscosity @ 100°C				Base Numbe	r	
	²⁰ 18 Abnormal			10.0	Base		
	16 - Base			2.0		\cap	\wedge
	14			8.0 0.0 Base Number (mg KOH/g) 4.0		.~	Λ 1
			1	E 6.0	N	~	V \ /
	20012			and Hand			$\langle \wedge \rangle$
	8		\wedge				V V
	6		• \	2.0			
	4			0.0			
	lan 23/17	1/19	5/21 4/21	0.0	an23/17 - Sep7/17 -	3/19 - 1/19 -	5/21 4/21
	Jan 23/17 Sep 7/17 Jul6/18 Feb 28/19	Jul31/19 Mar10/20	Jan 15/21 Sep 24/21 Sep 10/22	Sep 12/23	Jan23/17 Sep7/17 Jul6/18	Feb28/19 Jul31/19 Mar10/20	Jan15/21 Sep24/21 Sep10/22 Sep12/23
Laboratory	: WearCheck USA - 5				GFL		009 - Fairburn
Sample No.		Received		Sep 2023		6905	Roosevelt Hwy
Lab Number Unique Number		Diagnos Diagnost		Sep 2023 s Davis			Fairburn, GA US 30213
Certificate L2367 Test Package				5 5413		Cor	tact: Eric Jones
To discuss this sample report,				Э.			ies@gflenv.com
* - Denotes test methods that a	are outside of the ISO 17	7025 sco	pe of accred	litation.		Т	: (678)630-9927
Statements of conformity to spec	cifications are based on th	e simple	acceptance of	decision rule (JCGM 106:201	2)	F: