MAR III

WEAR CHECK

OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINANTS	MARGINAL
OIL CONDITION	NORMAL

Machine Id
CATERPILLAR DG#2 (S/N DPC00210)
Component
Starboard Main Engine
Fluid
PETRO CANADA DURON HP 15W40 (625 LTR)

RECOMMENDATION

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor. No other corrective action is recommended at this time.

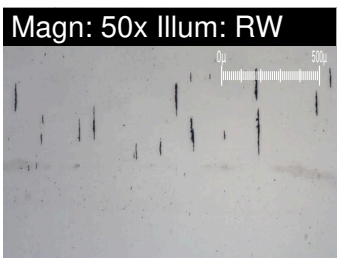
WEAR

All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system.

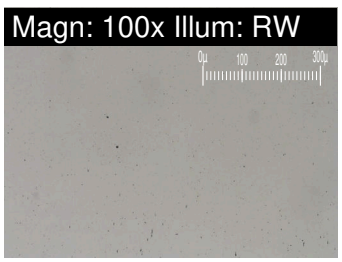
Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0761460	WC0757660	WC0576999
Sample Date		Client Info		24 Feb 2023	12 Nov 2022	02 Sep 2022
Machine Age	hrs	Client Info		7205	6365	5015
Oil Age	hrs	Client Info		1279	365	1000
Filter Age	hrs	Client Info		1279	365	1000
Oil Changed		Client Info		Changed	N/A	N/A
Filter Changed		Client Info		Changed	Not Changd	N/A
Sample Status				MARGINAL	NORMAL	MARGINAL
PQ		ASTM D8184*		0	0	0
Iron	ppm	ASTM D5185(m)	>75	5	2	5
Chromium	ppm	ASTM D5185(m)	>8	0	0	0
Nickel	ppm	ASTM D5185(m)	>2	<1	<1	<1
Titanium	ppm	ASTM D5185(m)	>3	<1	<1	0
Silver	ppm	ASTM D5185(m)	>2	0	0	0
Aluminum	ppm	ASTM D5185(m)	>15	1	<1	<1
Lead	ppm	ASTM D5185(m)	>18	3	<1	▲ 11
Copper	ppm	ASTM D5185(m)	>80	22	2	7
Tin	ppm	ASTM D5185(m)	>14	<1	<1	<1
Vanadium	ppm	ASTM D5185(m)		0	0	0
White Metal	scalar	Visual*	NONE	NONE	---	---
Yellow Metal	scalar	Visual*	NONE	VLITE	---	---
Large Particles		DR-Ferr*		6.6	4.4	4.2
Small Particles		DR-Ferr*		5.7	4.0	4.0
Total Particles		DR-Ferr*	>---	12.3	8.4	8.2
Large Particles Percentage	%	DR-Ferr*		7.3	4.8	2.4
Severity Index		DR-Ferr*		6	2	1
Ferrous Rubbing	Scale 0-10	ASTM D7684*		2	2	1
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		1	1	1
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*				
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*				
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*				
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*				
Nonferrous Rolling	Scale 0-10	ASTM D7684*				
Nonferrous Other	Scale 0-10	ASTM D7684*				

Magn: 200x Illum: BC

Magn: 50x Illum: RW



Magn: 100x Illum: RW



CONTAMINANTS

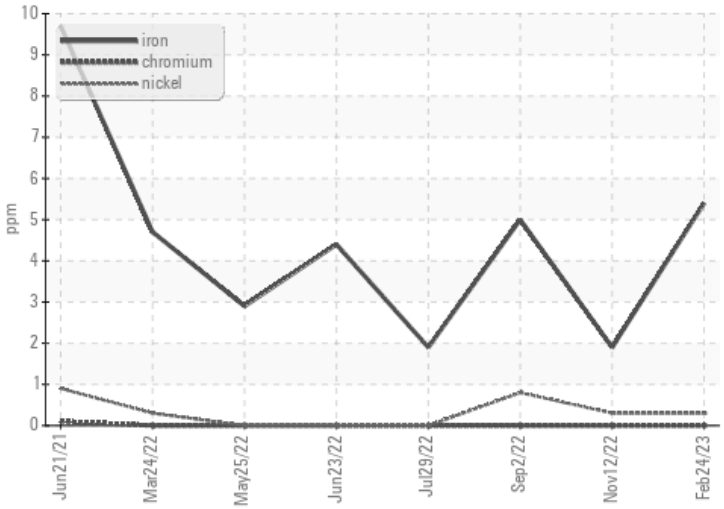
Light fuel dilution occurring. No other contaminants were detected in the oil.

OIL CONDITION

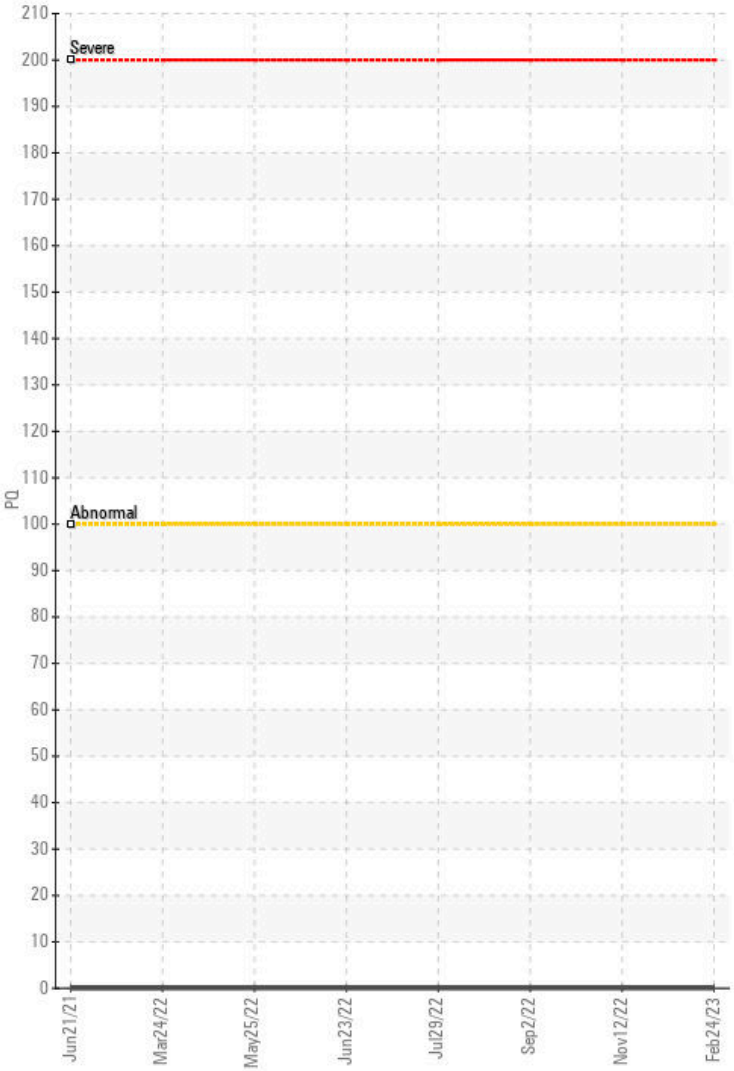
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Silicon	ppm	ASTM D5185(m)	>20	**2**	2	2
Potassium	ppm	ASTM D5185(m)	>20	**0**	0	0
Fuel	%	ASTM D7593*	>4.0	▲ **2.2**	<1.0	▲ 2
Water		WC Method	>0.1	**NEG**	NEG	NEG
Glycol		WC Method		**NEG**	NEG	NEG
Soot %	%	ASTM D7844*		**0**	0	0
Nitration	Abs/cm	ASTM D7624*	>20	**7.8**	6.0	7.5
Sulfation	Abs/.1mm	ASTM D7415*	>30	**22.8**	19.6	20.9
Silt	scalar	Visual*	NONE	**NONE**	---	---
Debris	scalar	Visual*	NONE	**NONE**	---	---
Sand/Dirt	scalar	Visual*	NONE	**NONE**	---	---
Appearance	scalar	Visual*	NORML	**NORML**	---	---
Odor	scalar	Visual*	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	Visual*	>0.1	**NEG**	NEG	NEG
Carbonaceous Material	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*		**1**	1	
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**1**	1	1
Sodium	ppm	ASTM D5185(m)	>75	**2**	2	2
Boron	ppm	ASTM D5185(m)	0	**2**	2	2
Barium	ppm	ASTM D5185(m)	0	**0**	0	0
Molybdenum	ppm	ASTM D5185(m)	60	**59**	58	58
Manganese	ppm	ASTM D5185(m)	0	**<1**	<1	<1
Magnesium	ppm	ASTM D5185(m)	1010	**967**	957	969
Calcium	ppm	ASTM D5185(m)	1070	**1112**	1072	1084
Phosphorus	ppm	ASTM D5185(m)	1150	**1044**	1073	1054
Zinc	ppm	ASTM D5185(m)	1270	**1194**	1187	1191
Sulfur	ppm	ASTM D5185(m)	2060	**2538**	2700	2605
Oxidation	Abs/.1mm	ASTM D7414*	>25	**16.7**	14.7	16.2
Base Number (BN)	mg KOH/g	ASTM D2896*	9.8	**9.17**	9.41	9.15
Visc @ 100°C	cSt	ASTM D7279(m)	15.6	**12.9**	13.5	12.4
Lubricant Degradation	Scale 0-10	ASTM D7684*				

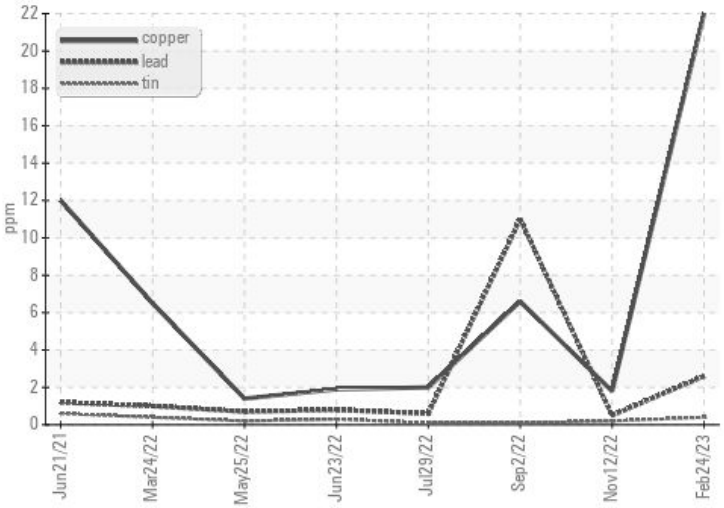
Ferrous Alloys



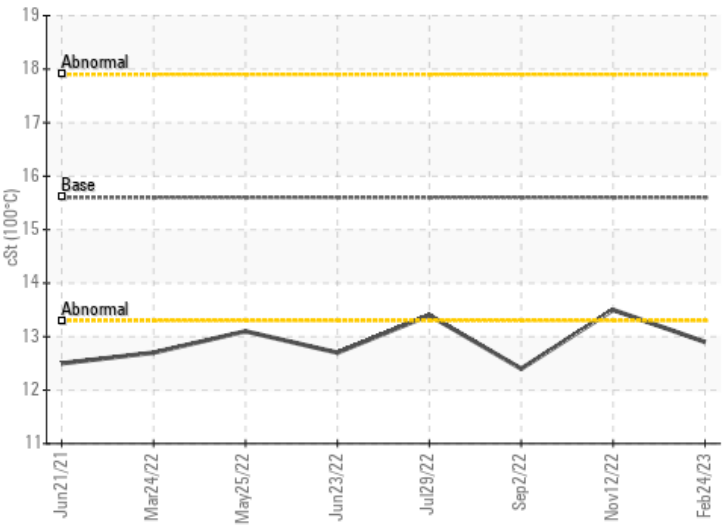
PQ



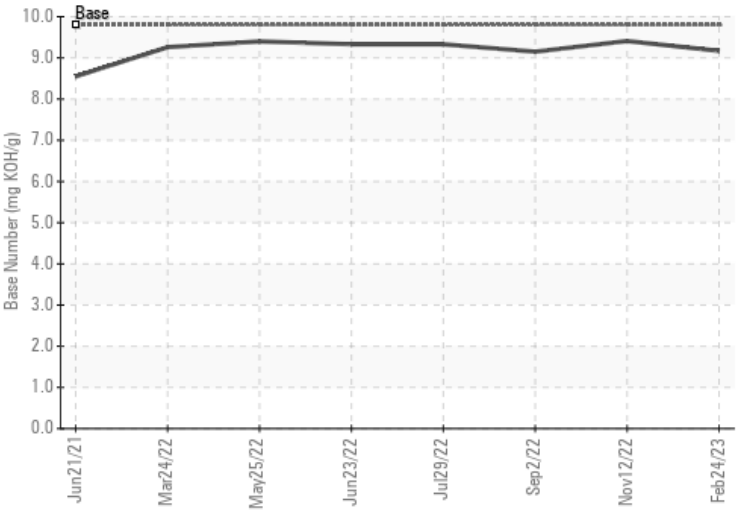
Non-ferrous Metals



Viscosity @ 100°C



Base Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 **Canadian Coast Guard - John Cabot**
Sample No. : WC0761460 **Recieved** : 03 Apr 2023
Lab Number : 02549204 **Diagnosed** : 04 Apr 2023
Unique Number : 5554214 **Diagnostician** : Kevin Marson
Test Package : MAR 3 (Additional Tests: FuelDilution, PercentFuel, Visual)

To discuss this sample report, contact Customer Service at 1-800-268-2131.
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
Validity of results and interpretation are based on the sample and information as supplied.

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