MAR III

WEAR CHECK

OIL ANALYSIS REPORT

WEAR	MARGINAL
CONTAMINANTS	NORMAL
OIL CONDITION	NORMAL

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

RECOMMENDATION

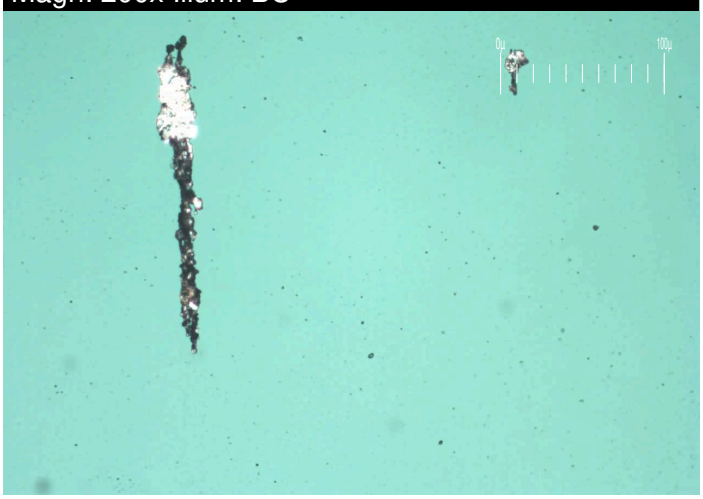
Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition. No other corrective action is recommended at this time.

WEAR

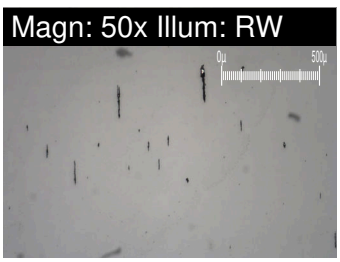
Wear particle analysis indicates that the ferrous rolling particles are marginal. All other component wear rates are normal.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0912273	WC0883765	WC0883752
Sample Date		Client Info		05 May 2024	24 Feb 2024	17 Dec 2023
Machine Age	hrs	Client Info		12207	11119	10931
Oil Age	hrs	Client Info		1087	67	0
Filter Age	hrs	Client Info		1087	67	0
Oil Changed		Client Info		Changed	Not Changd	N/A
Filter Changed		Client Info		Changed	Not Changd	N/A
Sample Status				MARGINAL	MARGINAL	MARGINAL
PQ		ASTM D8184*		0	0	0
Iron	ppm	ASTM D5185(m)	>75	6	1	5
Chromium	ppm	ASTM D5185(m)	>8	0	0	0
Nickel	ppm	ASTM D5185(m)	>2	0	0	<1
Titanium	ppm	ASTM D5185(m)	>3	0	0	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	2	0	2
Copper	ppm	ASTM D5185(m)	>80	2	<1	2
Tin	ppm	ASTM D5185(m)	>14	0	0	0
Vanadium	ppm	ASTM D5185(m)		0	0	0
Large Particles		DR-Ferr*		5.2	3.5	3.1
Small Particles		DR-Ferr*		3.4	2.8	2.1
Total Particles		DR-Ferr*	>---	8.6	6.3	5.2
Large Particles Percentage	%	DR-Ferr*		20.9	11.1	19.2
Severity Index		DR-Ferr*		9	2	3
Ferrous Rubbing	Scale 0-10	ASTM D7684*		2	3	2
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*			1	1
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*		1		
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*				

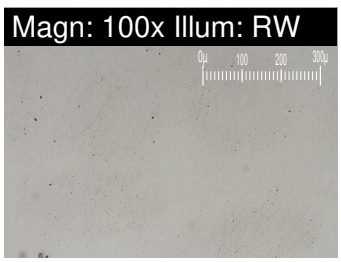
Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW



CONTAMINANTS

Fuel content negligible. There is no indication of any contamination in the oil.

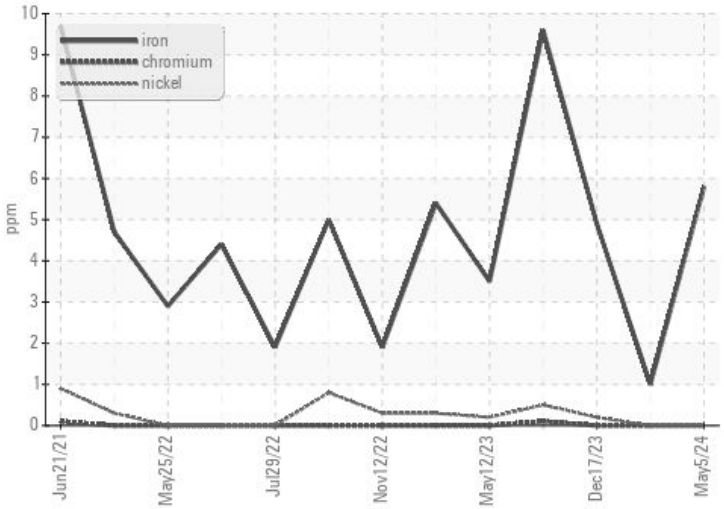
Silicon	ppm	ASTM D5185(m)	>20	**2**	1	2
Potassium	ppm	ASTM D5185(m)	>20	**0**	0	4
Fuel	%	ASTM D7593*	>4.0	**0.7**	<1.0	1.5
Water		WC Method	>0.1	**NEG**	NEG	NEG
Glycol		WC Method		**NEG**	NEG	NEG
Soot %	%	ASTM D7844*		**0**	0	0
Nitration	Abs/cm	ASTM D7624*	>20	**7.7**	4.7	7.1
Sulfation	Abs/.1mm	ASTM D7415*	>30	**20.4**	17.8	20.1
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	1
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**1**	1	1

OIL CONDITION

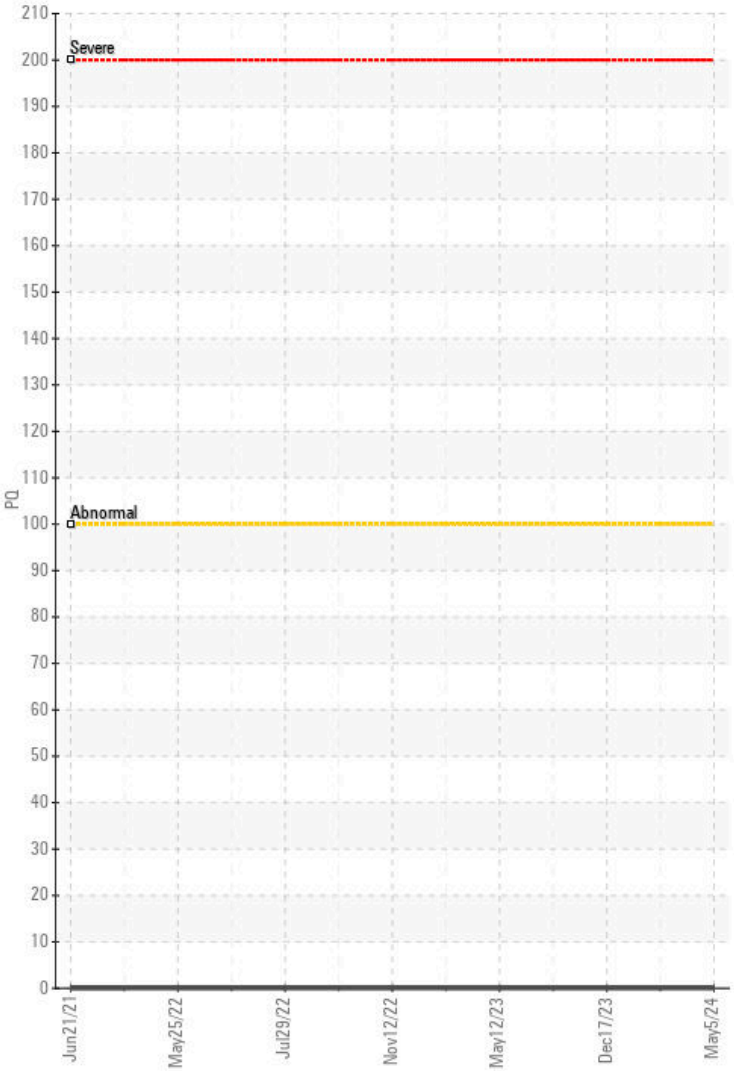
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185(m)	>75	**2**	1	1
Boron	ppm	ASTM D5185(m)	0	**2**	0	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	**0**	0	0
Magnesium	ppm	ASTM D5185(m)	1010	**985**	976	975
Calcium	ppm	ASTM D5185(m)	1070	**1064**	1052	1076
Phosphorus	ppm	ASTM D5185(m)	1150	**982**	987	1040
Zinc	ppm	ASTM D5185(m)	1270	**1205**	1168	1203
Sulfur	ppm	ASTM D5185(m)	2060	**2452**	2549	2718
Oxidation	Abs/.1mm	ASTM D7414*	>25	**16.6**	13.2	16.0
Base Number (BN)	mg KOH/g	ASTM D2896*	9.8	**9.27**	10.52	9.68
Visc @ 100°C	cSt	ASTM D7279(m)	15.6	**13.1**	14.6	13.0
Lubricant Degradation	Scale 0-10	ASTM D7684*				

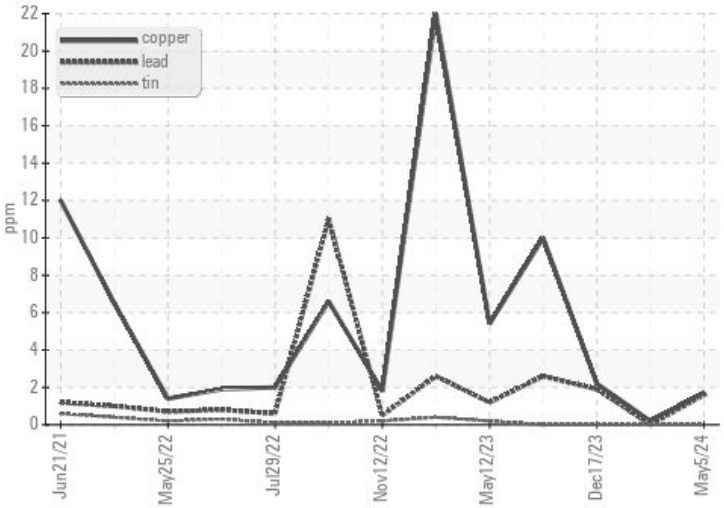
Ferrous Alloys



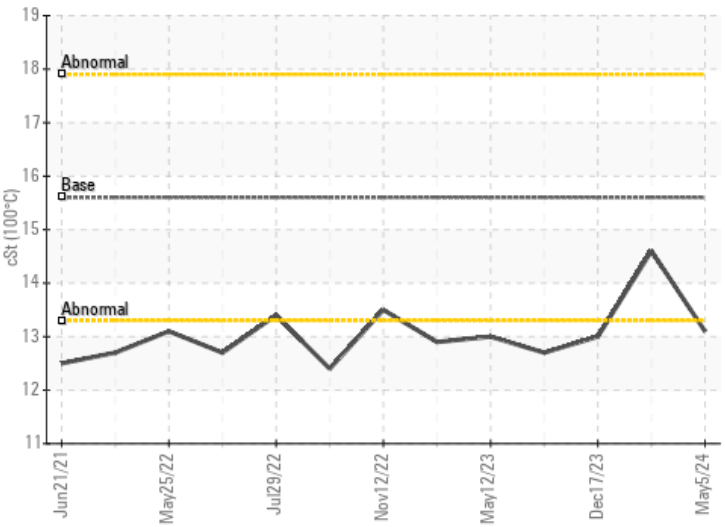
PQ



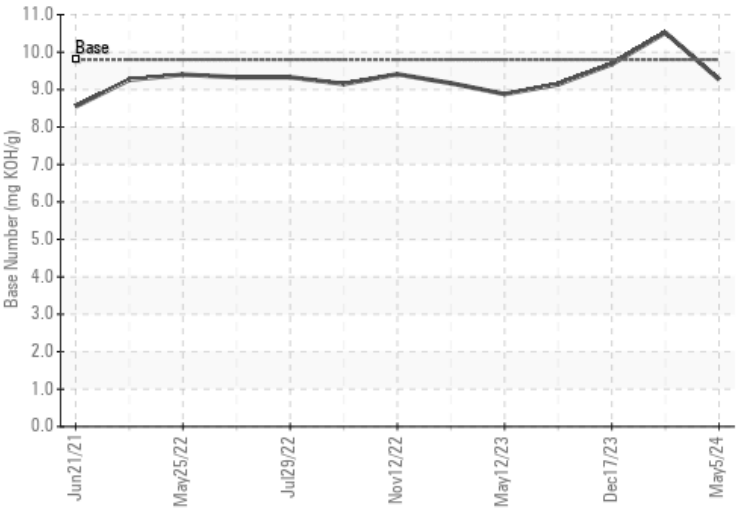
Non-ferrous Metals



Viscosity @ 100°C



Base Number



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0912273
Lab Number : 02637040
Unique Number : 5786202
Test Package : MAR 3 (Additional Tests: FuelDilution, PercentFuel)

Received : 23 May 2024
Tested : 24 May 2024
Diagnosed : 24 May 2024 - Kevin Marson

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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