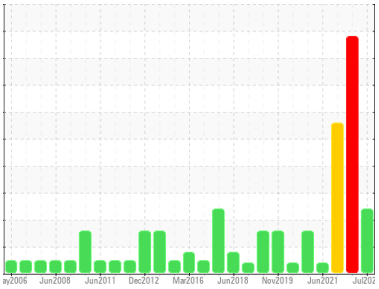
PROBLEM SUMMARY

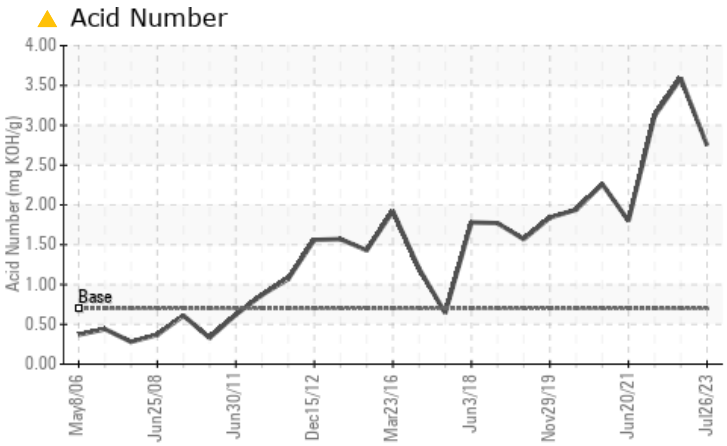
Sample Rating Trend

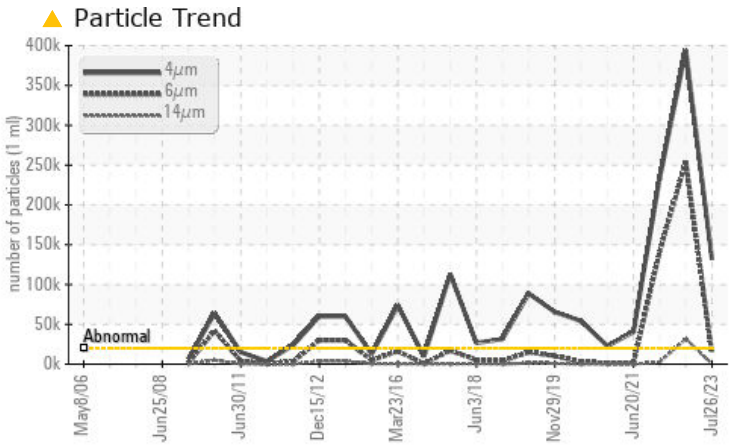


DEGRADATION

Area
1430
Machine Id
1430-5652-4002 - Cu/Ni AERATION TANK 1 AGITATOR
Component
1 Gearbox
Fluid
PETRO CANADA ENDURATEX SYNTHETIC EP 220 (80 LTR)

COMPONENT CONDITION SUMMARY





RECOMMENDATION

We recommend that you drain the oil from the component if this has not already been done. We recommend you service the filters on this component. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS

Sample Status				ABNORMAL	SEVERE	SEVERE
Particles >4µm		ASTM D7647	>20000	▲ **131769**	⬢ 394466	⬢ 233259
Particles >6µm		ASTM D7647	>5000	▲ **13506**	⬢ 254036	⬢ 141207
Oil Cleanliness		ISO 4406 (c)	>21/19/16	▲ **24/21/15**	⬢ 26/25/22	⬢ 25/24/19
Acid Number (AN)	mg KOH/g	ASTM D974*	0.7	▲ **2.75**	▲ 3.59	▲ 3.12

Customer Id: INCVOS
Sample No.: PC0077336
Lab Number: 02578544
Test Package: IND 3

To manage this report scan the QR code

To discuss the diagnosis or test data:
Kevin Marson +1 (289)291-4644 x4644
Kevin.Marson@wearcheck.com

To change component or sample information:
Gloria Gonzalez +1 (289)291-4643 x4643
gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Change Fluid	---	---	?	We recommend that you drain the oil from the component if this has not already been done.
Change Filter	---	---	?	We recommend you service the filters on this component.
Resample	---	---	?	We recommend an early resample to monitor this condition.

HISTORICAL DIAGNOSIS

04 Feb 2023 Diag: Kevin Marson

ISO

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation.All component wear rates are normal. Particles >14µm are severely high. Particles >21µm are severely high. Particles >6µm are severely high. Oil Cleanliness are severely high. Particles >4µm are severely high. The AN level is above the recommended limit. The oil is no longer serviceable.

view report

08 Sep 2022 Diag: Kevin Marson

ISO

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation.All component wear rates are normal. Particles >6µm are severely high. Particles >4µm are severely high. Oil Cleanliness are severely high. Particles >14µm are abnormally high. Particles >21µm are abnormally high. The AN level is above the recommended limit. The oil is no longer serviceable.

view report

20 Jun 2021 Diag: Kevin Marson

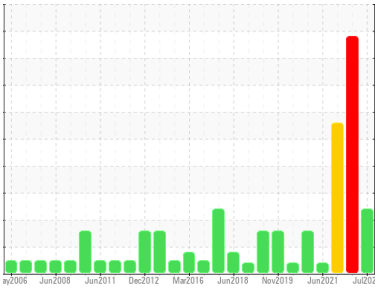
ISO

We recommend you service the filters on this component. We recommend an early resample to monitor this condition.All component wear rates are normal. Particles >4µm are abnormally high. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



DEGRADATION

Area
1430
Machine Id
1430-5652-4002 - Cu/Ni AERATION TANK 1 AGITATOR
Component
1 Gearbox
Fluid
PETRO CANADA ENDURATEX SYNTHETIC EP 220 (80 LTR)

DIAGNOSIS

Recommendation

We recommend that you drain the oil from the component if this has not already been done. We recommend you service the filters on this component. We recommend an early resample to monitor this condition.

Wear

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

Contaminants

There is a moderate amount of silt (particulates < 14 microns in size) present in the oil.

Oil Condition

The AN level is above the recommended limit. The oil is no longer serviceable.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**PC0077336**	PC0058642	PC0040262
Sample Date		Client Info		**26 Jul 2023**	04 Feb 2023	08 Sep 2022
Machine Age	days	Client Info		**0**	0	0
Oil Age	days	Client Info		**0**	0	0
Oil Changed		Client Info		**N/A**	N/A	N/A
Sample Status				**ABNORMAL**	SEVERE	SEVERE

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**0**	0	0
Iron	ppm	ASTM D5185(m)	>200	**11**	39	10
Chromium	ppm	ASTM D5185(m)	>15	**0**	0	0
Nickel	ppm	ASTM D5185(m)	>15	**0**	2	<1
Titanium	ppm	ASTM D5185(m)		**0**	0	0
Silver	ppm	ASTM D5185(m)		**0**	0	0
Aluminum	ppm	ASTM D5185(m)	>25	**<1**	<1	0
Lead	ppm	ASTM D5185(m)	>100	**0**	0	0
Copper	ppm	ASTM D5185(m)	>200	**<1**	7	<1
Tin	ppm	ASTM D5185(m)	>25	**0**	0	0
Antimony	ppm	ASTM D5185(m)	>5	**0**	<1	<1
Vanadium	ppm	ASTM D5185(m)		**0**	0	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

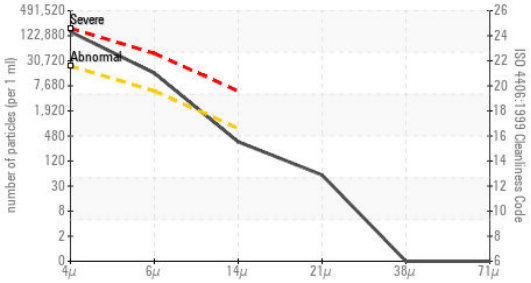
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	33	**25**	23	26
Barium	ppm	ASTM D5185(m)	5	**0**	0	0
Molybdenum	ppm	ASTM D5185(m)		**0**	0	0
Manganese	ppm	ASTM D5185(m)		**0**	0	0
Magnesium	ppm	ASTM D5185(m)	5	**<1**	<1	0
Calcium	ppm	ASTM D5185(m)	5	**2**	<1	<1
Phosphorus	ppm	ASTM D5185(m)	437	**287**	240	223
Zinc	ppm	ASTM D5185(m)	5	**4**	2	2
Sulfur	ppm	ASTM D5185(m)	5000	**4565**	3933	4100
Lithium	ppm	ASTM D5185(m)		**<1**	2	1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>50	**1**	4	1
Sodium	ppm	ASTM D5185(m)		**<1**	<1	1
Potassium	ppm	ASTM D5185(m)	>20	**<1**	<1	<1

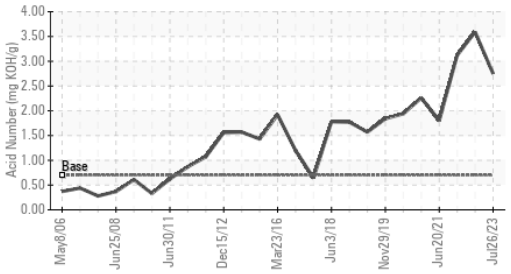
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>20000	▲ **131769**	⬢ 394466	⬢ 233259
Particles >6µm		ASTM D7647	>5000	▲ **13506**	⬢ 254036	⬢ 141207
Particles >14µm		ASTM D7647	>640	**306**	⬢ 31727	▲ 2623
Particles >21µm		ASTM D7647	>160	**49**	⬢ 5824	▲ 369
Particles >38µm		ASTM D7647	>40	**0**	38	3
Particles >71µm		ASTM D7647	>10	**0**	2	0
Oil Cleanliness		ISO 4406 (c)	>21/19/16	▲ **24/21/15**	⬢ 26/25/22	⬢ 25/24/19

OIL ANALYSIS REPORT

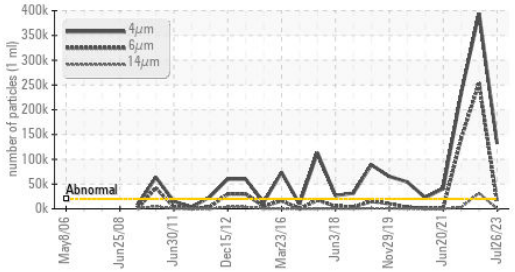
Particle Count



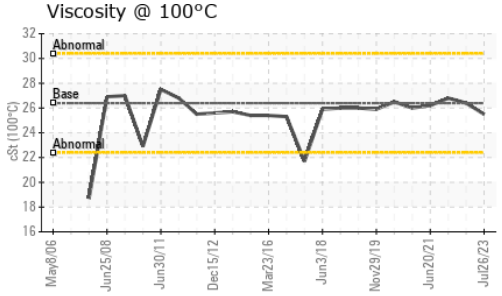
Acid Number



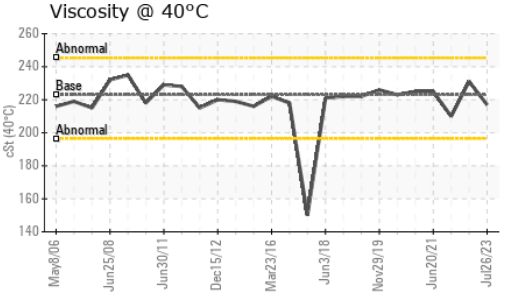
Particle Trend



Viscosity @ 100°C



Viscosity @ 40°C



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.7	▲ **2.75**	▲ 3.59	▲ 3.12

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	**VLITE**	LIGHT	NONE
Yellow Metal	scalar	Visual*	NONE	**NONE**	NONE	NONE
Precipitate	scalar	Visual*	NONE	**NONE**	NONE	NONE
Silt	scalar	Visual*	NONE	**VLITE**	NONE	NONE
Debris	scalar	Visual*	NONE	**VLITE**	NONE	NONE
Sand/Dirt	scalar	Visual*	NONE	**NONE**	LIGHT	NONE
Appearance	scalar	Visual*	NORML	**NORML**	NORML	NORML
Odor	scalar	Visual*	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	Visual*	>0.2	**NEG**	NEG	NEG
Free Water	scalar	Visual*		**NEG**	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	223	**217**	231	210
Visc @ 100°C	cSt	ASTM D7279(m)	26.39	**25.5**	26.4	26.8
Viscosity Index (VI)	Scale	ASTM D2270*	151	**148**	146	162

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : PC0077336 **Received** : 25 Aug 2023
Lab Number : 02578544 **Diagnosed** : 28 Aug 2023
Unique Number : 5631604 **Diagnostician** : Kevin Marson
Test Package : IND 3 (Additional Tests: KV100, PrtCount, TAN Man, VI)

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.

Vale - Voisey`s Bay
Voisey's Bay Mine Site, P.O. Box 7001, Stn. C Happy Valley
Goose Bay, NL
CA A0P 1C0
Contact: Robert Feltham
robert.feltham@vale.com
T:
F: x:

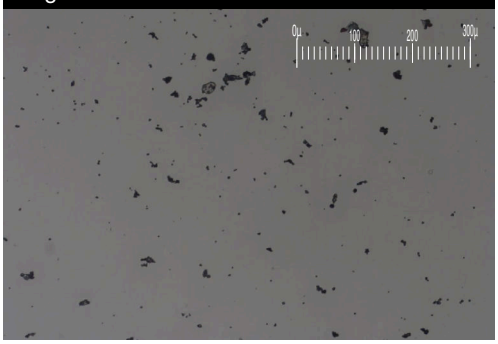
FERROGRAPHY REPORT

Area
1430
Machine Id
1430-5652-4002 - Cu/Ni AERATION TANK 1 AGITATOR
Component
1 Gearbox
Fluid
PETRO CANADA ENDURATEX SYNTHETIC EP 220 (80 LTR)

Magn: 200x Illum: BC

Magn: 50x Illum: RW

Magn: 100x Illum: RW

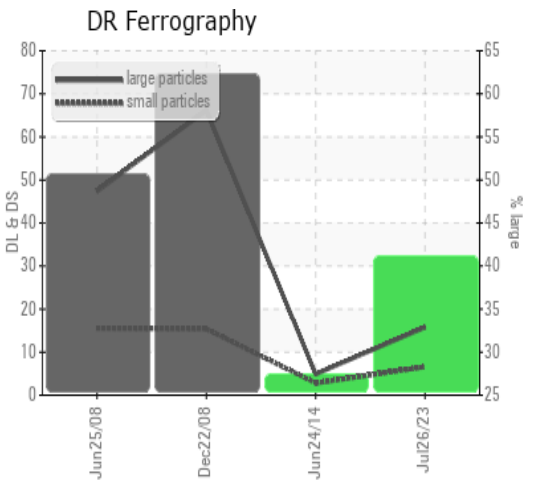


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**15.8**	---	---
Small Particles		DR-Ferr*		**6.6**	---	---
Total Particles		DR-Ferr*	>---	**22.4**	---	---
Large Particles Percentage	%	DR-Ferr*		**41.1**	---	---
Severity Index		DR-Ferr*		**145**	---	---

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		**2**		
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		**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*				
Carbonaceous Material	Scale 0-10	ASTM D7684*				
Lubricant Degradation	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*		**1**		
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**2**		

WEAR

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



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