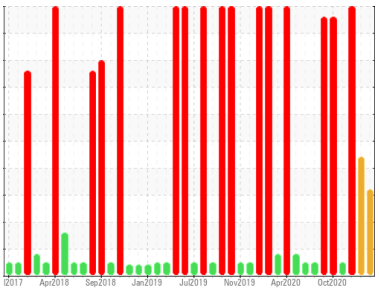
PROBLEM SUMMARY

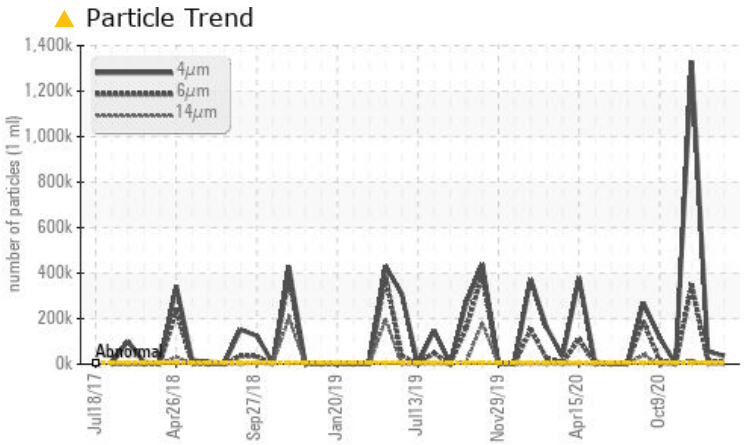
Sample Rating Trend



ADDITIVES

Area
Aft Machinery Space [450122752]
Machine Id
Thruster Aft Port - Seal Oil System (S/N Sample Tag CL-06002-S3)
Component
Sealing System
Fluid
PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS

Sample Status				**ABNORMAL**	SEVERE	SEVERE
Boron	ppm	ASTM D5185(m)		▲ **21**	2	2
Sulfur	ppm	ASTM D5185(m)		▲ **16085**	7798	8300
Particles >4µm		ASTM D7647	>5000	▲ **36153**	⬢ 55972	⬢ 1329299
Particles >6µm		ASTM D7647	>1300	▲ **7771**	⬢ 15555	⬢ 348720
Particles >14µm		ASTM D7647	>160	▲ **771**	▲ 780	⬢ 14425
Particles >21µm		ASTM D7647	>40	▲ **232**	▲ 160	⬢ 3450
Particles >38µm		ASTM D7647	>10	▲ **16**	4	⬢ 118
Oil Cleanliness		ISO 4406 (c)	>19/17/14	▲ **22/20/17**	⬢ 23/21/17	⬢ 28/26/21

Customer Id: TERHAM
Sample No.: PC
Lab Number: 02552181
Test Package: MAR 2

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 Filter	---	---	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.
Resample	---	---	?	We recommend an early resample to monitor this condition.
Check Fluid Source	---	---	?	Confirm the source of the lubricant being utilized for top-up/fill.
Filter Fluid	---	---	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.

HISTORICAL DIAGNOSIS

ISO

05 Feb 2023 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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 acceptable for this fluid. The fluid is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

view report

WATER

22 Nov 2020 Diag: Kevin Marson

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. 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. We recommend that you drain the fluid from the component if this has not already been done. Resample in 30-45 days to monitor this situation.All component wear rates are normal. ppm Water contamination levels are severely high. Water contamination levels are severely high. Particles >38µm are severely high. Particles >6µm are severely high. Particles >14µm are severely high. Particles >21µm are severely high. Particles >4µm are severely high. There is a high concentration of water present in the fluid. Free water present. The white residue present in the sample is fluid additive precipitate. The AN level is acceptable for this fluid.

view report

NORMAL

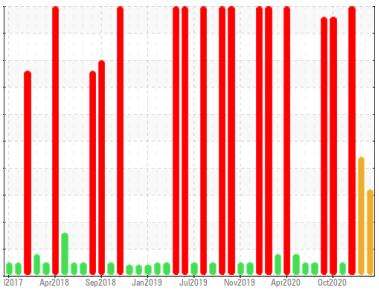
03 Nov 2020 Diag: Kevin Marson

Resample at the next service interval to monitor.All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the fluid is suitable for further service.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



ADDITIVES

Area
Aft Machinery Space [450122752]
Machine Id
Thruster Aft Port - Seal Oil System (S/N Sample Tag CL-06002-S3)
Component
Sealing System
Fluid
PETRO CANADA ENERGOL GR-XP ISO 150 (65 LTR)

DIAGNOSIS

Recommendation

We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal.

Contamination

There is a moderate amount of particulates (2 to 100 microns in size) present in the fluid.

Fluid Condition

Additive levels indicate the addition of a different brand, or type of fluid. The AN level is acceptable for this fluid. The fluid is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**PC**	PC	PC
Sample Date		Client Info		**31 Mar 2023**	05 Feb 2023	22 Nov 2020
Machine Age	hrs	Client Info		**0**	0	0
Oil Age	hrs	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)	>100	**2**	48	16
Chromium	ppm	ASTM D5185(m)	>3	**0**	0	<1
Nickel	ppm	ASTM D5185(m)	>8	**<1**	<1	<1
Titanium	ppm	ASTM D5185(m)		**0**	0	0
Silver	ppm	ASTM D5185(m)		**0**	<1	<1
Aluminum	ppm	ASTM D5185(m)	>3	**0**	<1	<1
Lead	ppm	ASTM D5185(m)		**0**	<1	0
Copper	ppm	ASTM D5185(m)	>3	**<1**	<1	<1
Tin	ppm	ASTM D5185(m)		**0**	0	0
Antimony	ppm	ASTM D5185(m)		**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

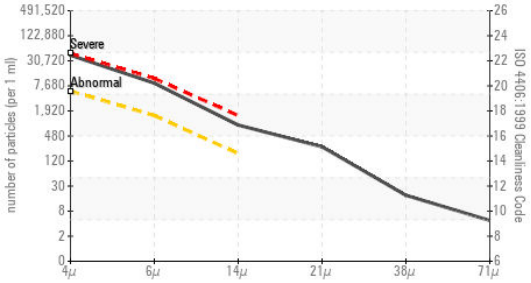
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		▲ **21**	2	2
Barium	ppm	ASTM D5185(m)		**0**	0	0
Molybdenum	ppm	ASTM D5185(m)		**0**	0	<1
Manganese	ppm	ASTM D5185(m)		**0**	<1	<1
Magnesium	ppm	ASTM D5185(m)		**0**	2	16
Calcium	ppm	ASTM D5185(m)		**0**	2	6
Phosphorus	ppm	ASTM D5185(m)		**215**	317	274
Zinc	ppm	ASTM D5185(m)		**2**	6	6
Sulfur	ppm	ASTM D5185(m)		▲ **16085**	7798	8300
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>25	**1**	9	5
Sodium	ppm	ASTM D5185(m)		**0**	4	110
Potassium	ppm	ASTM D5185(m)	>20	**0**	<1	5

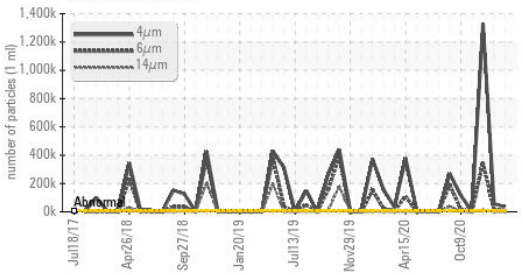
FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>5000	▲ **36153**	⬢ 55972	⬢ 1329299
Particles >6µm	ASTM D7647	>1300	▲ **7771**	⬢ 15555	⬢ 348720
Particles >14µm	ASTM D7647	>160	▲ **771**	▲ 780	⬢ 14425
Particles >21µm	ASTM D7647	>40	▲ **232**	▲ 160	⬢ 3450
Particles >38µm	ASTM D7647	>10	▲ **16**	4	⬢ 118
Particles >71µm	ASTM D7647	>3	**4**	0	2
Oil Cleanliness	ISO 4406 (c)	>19/17/14	▲ **22/20/17**	⬢ 23/21/17	⬢ 28/26/21

OIL ANALYSIS REPORT

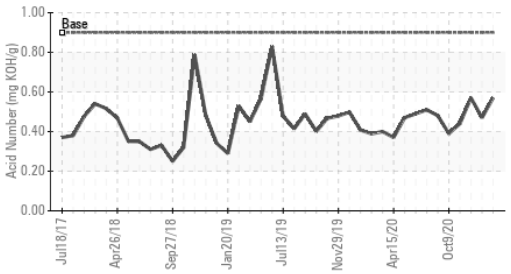
Particle Count



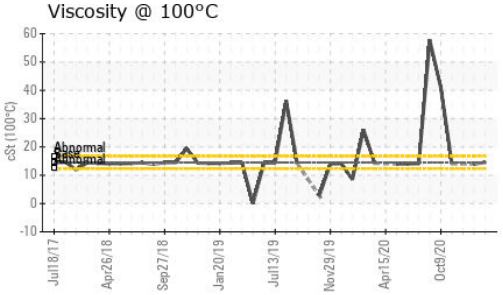
Particle Trend



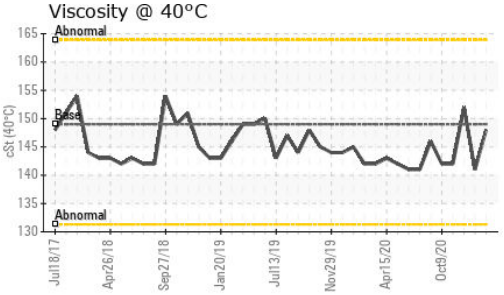
Acid Number



Viscosity @ 100°C



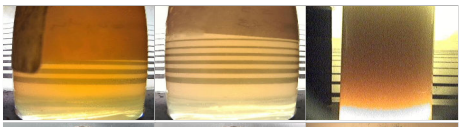
Viscosity @ 40°C



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.9	**0.57**	0.47	0.57

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	**NONE**	NONE	NONE
Precipitate	scalar	Visual*	NONE	**NONE**	NONE	▲ LTMOD
Silt	scalar	Visual*	NONE	**NONE**	NONE	NONE
Debris	scalar	Visual*	NONE	**VLITE**	VLITE	NONE
Sand/Dirt	scalar	Visual*	NONE	**NONE**	NONE	NONE
Appearance	scalar	Visual*	NORML	**NORML**	NORML	NORML
Odor	scalar	Visual*	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	Visual*		**NEG**	NEG	▲ 1%
Free Water	scalar	Visual*		**NEG**	NEG	▲ 1%

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	149	**148**	141	152
Visc @ 100°C	cSt	ASTM D7279(m)	14.5	**14.6**	13.9	---
Viscosity Index (VI)	Scale	ASTM D2270*		**97**	94	---

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. : PC **Received** : 18 Apr 2023
Lab Number : 02552181 **Diagnosed** : 19 Apr 2023
Unique Number : 5565196 **Diagnostician** : Kevin Marson
Test Package : MAR 2 (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.

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