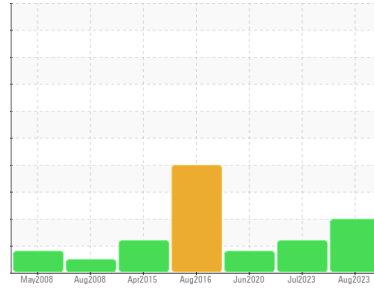
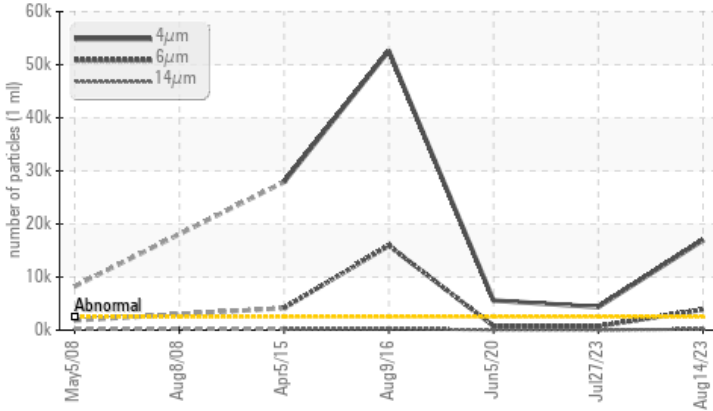


Area
Fwd Machinery Space [450188488]
 Machine Id
Thruster Fwd Fore - Steering Gear Lubrication (S/N Sample Tag CL-06005-S4)
 Component
Steering
 Fluid
PETRO CANADA ENERGOL GR-XP ISO 150 (5000 LTR)



COMPONENT CONDITION SUMMARY

▲ Particle Trend



RECOMMENDATION

We recommend you service the filters on this component. We recommend an early resample to monitor this condition. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using MAR 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid.

PROBLEMATIC TEST RESULTS

Sample Status			ABNORMAL	ATTENTION	ABNORMAL
Particles >4µm	ASTM D7647	>2500	▲ 16951	▲ 4348	▲ 5580
Particles >6µm	ASTM D7647	>640	▲ 3879	▲ 710	▲ 768
Particles >14µm	ASTM D7647	>80	▲ 191	21	44
Particles >21µm	ASTM D7647	>20	▲ 39	6	14
Oil Cleanliness	ISO 4406 (c)	>18/16/13	▲ 21/19/15	▲ 19/17/12	▲ 20/17/13

Customer Id: TERHAM
 Sample No.: PC0052584
 Lab Number: 02582297
 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 recommend you service the filters on this component.
Resample	---	---	?	We recommend an early resample to monitor this condition.
Contact Required	---	---	?	Please contact your representative for information regarding the proper sampling kits for your service.
Alert	---	---	?	NOTE: We recommend using MAR 3 test kits,

HISTORICAL DIAGNOSIS

27 Jul 2023 Diag: Kevin Marson



We recommend you service the filters on this component. Resample at the next service interval to monitor. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using MAR 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid. Component wear rates appear to be normal (unconfirmed). There is a light amount of silt (particulates < 14 microns in size) present in the fluid. The AN level is acceptable for this fluid. The condition of the fluid is suitable for further service.

view report



05 Jun 2020 Diag: Kevin Marson



We recommend you service the filters on this component. We recommend an early resample to monitor this condition. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using MAR 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid. Component wear rates appear to be normal (unconfirmed). Particles >4µm are abnormally high. Particles >6µm are notably high. The AN level is acceptable for this fluid. The condition of the fluid is suitable for further service.

view report



09 Aug 2016 Diag: Wes Davis

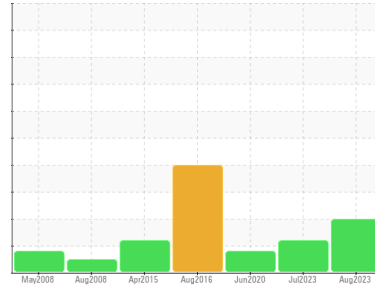


Check seals and/or filters for points of contaminant entry. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. 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 is severe. Particles >14µm are abnormally high. The water content is negligible. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

view report



Area
Fwd Machinery Space [450188488]
Machine Id
Thruster Fwd Fore - Steering Gear Lubrication (S/N Sample Tag CL-06005-S4)
Component
Steering
Fluid
PETRO CANADA ENERGOL GR-XP ISO 150 (5000 LTR)



DIAGNOSIS

Recommendation

We recommend you service the filters on this component. We recommend an early resample to monitor this condition. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using MAR 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid.

Wear

Component wear rates appear to be normal (unconfirmed).

Contamination

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

Fluid Condition

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	PC0052584	PC	PC
Sample Date	Client Info	14 Aug 2023	27 Jul 2023	05 Jun 2020
Machine Age	hrs	0	0	0
Oil Age	hrs	0	0	0
Oil Changed	Client Info	N/A	N/A	N/A
Sample Status		ABNORMAL	ATTENTION	ABNORMAL

WEAR METALS

method	limit/base	current	history1	history2	
PQ	ASTM D8184*	0	0	0	
Iron	ppm	ASTM D5185(m) >50	<1	<1	19
Chromium	ppm	ASTM D5185(m) >15	0	0	<1
Nickel	ppm	ASTM D5185(m) >5	0	<1	<1
Titanium	ppm	ASTM D5185(m)	0	0	0
Silver	ppm	ASTM D5185(m)	0	0	0
Aluminum	ppm	ASTM D5185(m) >5	0	<1	0
Lead	ppm	ASTM D5185(m) >10	0	0	0
Copper	ppm	ASTM D5185(m) >50	<1	0	<1
Tin	ppm	ASTM D5185(m) >5	0	0	0
Antimony	ppm	ASTM D5185(m)	0	0	<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)	19	14	2
Barium	ppm	ASTM D5185(m)	0	0	0
Molybdenum	ppm	ASTM D5185(m)	0	0	<1
Manganese	ppm	ASTM D5185(m)	0	0	<1
Magnesium	ppm	ASTM D5185(m)	<1	<1	0
Calcium	ppm	ASTM D5185(m)	14	4	6
Phosphorus	ppm	ASTM D5185(m)	195	173	283
Zinc	ppm	ASTM D5185(m)	6	4	24
Sulfur	ppm	ASTM D5185(m)	16137	9668	11104
Lithium	ppm	ASTM D5185(m)	<1	<1	<1

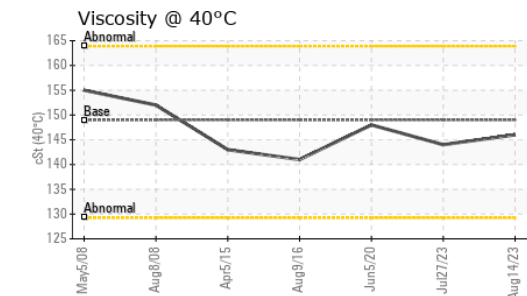
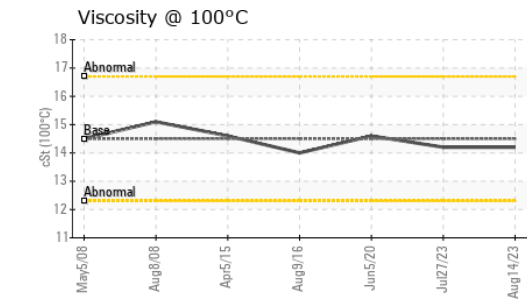
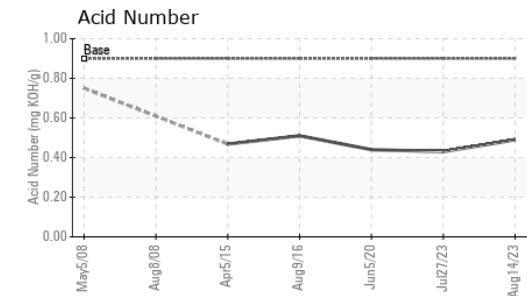
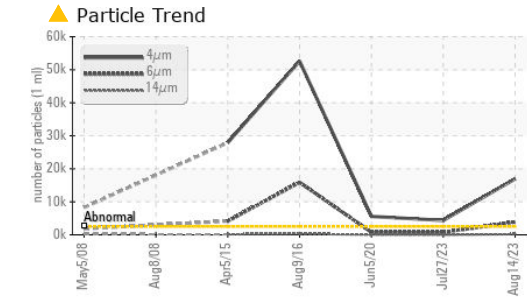
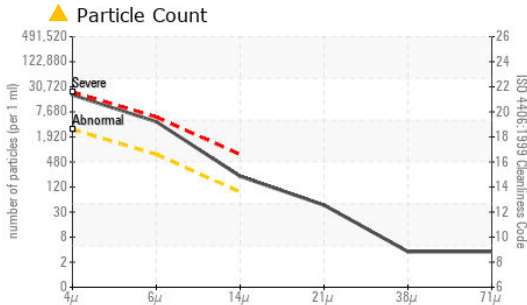
CONTAMINANTS

method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185(m) >15	2	2	4
Sodium	ppm	ASTM D5185(m)	<1	0	0
Potassium	ppm	ASTM D5185(m) >20	<1	0	<1

FLUID CLEANLINESS

method	limit/base	current	history1	history2	
Particles >4µm	ASTM D7647	>2500	▲ 16951	▲ 4348	▲ 5580
Particles >6µm	ASTM D7647	>640	▲ 3879	▲ 710	▲ 768
Particles >14µm	ASTM D7647	>80	▲ 191	21	44
Particles >21µm	ASTM D7647	>20	▲ 39	6	14
Particles >38µm	ASTM D7647	>4	3	1	0
Particles >71µm	ASTM D7647	>3	3	0	0
Oil Cleanliness	ISO 4406 (c)	>18/16/13	▲ 21/19/15	▲ 19/17/12	▲ 20/17/13

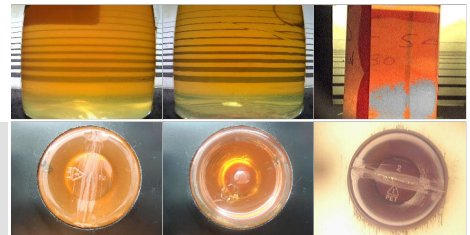
OIL ANALYSIS REPORT



FLUID DEGRADATION						
	method	limit/base	current	history1	history2	
Acid Number (AN)	mg KOH/g	ASTM D974*	0.9	0.49	0.43	0.44
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	NONE
Silt	scalar	Visual*	NONE	NONE	NONE	NONE
Debris	scalar	Visual*	NONE	VLITE	NONE	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*	>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)	149	146	144	148
Visc @ 100°C	cSt	ASTM D7279(m)	14.5	14.2	14.2	14.6
Viscosity Index (VI)	Scale	ASTM D2270*		94	95	97

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. : PC0052584 **Received** : 13 Sep 2023
Lab Number : **02582297** **Diagnosed** : 15 Sep 2023
Unique Number : 5643362 **Diagnostician** : Kevin Marson
Test Package : MAR 2 (Additional Tests: KV100, PQ, 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.

Suncor - Terra Nova Projects
 Scotia Centre, 235 Water Street
 St. John's, NL
 CA A1C 1B6
 Contact: Josh Hynes
 joshhynes@suncor.com
 T: (709)778-3575
 F: (709)724-2835