

PROBLEM SUMMARY

Gas Compression [450305175]

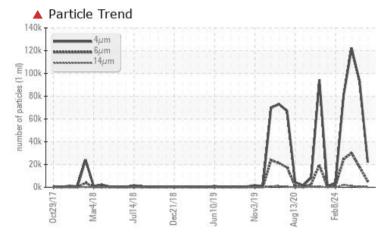
Compressor (HP2) - Lubrication System (S/N Sample Tag XX-23004-S1)

Lube System

Area

PETRO CANADA TURBOFLO XL32 (10350 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

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.

PROBLEMATIC TEST RESULTS					
Sample Status		SEVERE		SEVERE	
Particles >6µm	ASTM D7647 >	B20 A 17551	▲ 5126	▲ 30044	
Particles >14µm	ASTM D7647 >4	40 🔺 511	▲ 352	1 148	
Particles >21µm	ASTM D7647 >	10 🔺 114	▲ 89	A 278	
Particles >38µm	ASTM D7647 >	3 🔺 9	 7	🔺 11	
Oil Cleanliness	ISO 4406 (c) >-	-/15/12 🔺 24/21/1	6 🔺 22/20/16	▲ 24/22/17	

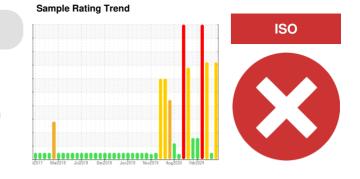
Customer Id: TERHAM Sample No.: PC0078295 Lab Number: 02631970 Test Package: MAR 2



To manage this report scan the QR code

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

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



RECOMMENDE	D 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			?	Resample in 30-45 days to monitor this situation.
Check Breathers			?	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.
Check Dirt Access			?	We advise that you check all areas where contaminants can enter the system.
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

02 Apr 2024 Diag:



view report

ISO

29 Mar 2024 Diag: Kevin Marson

01 Mar 2024 Diag: Bill Quesnel

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. 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 high amount of particulates (2 to 100 microns in size) present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



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. No other corrective action is recommended at this time. Diagnostician's Note: The debris on the bottom of the sample combined with the ferrous red & black oxides present in the ferrogram indicate this was an improperly taken sample (dead pipe line, or low on the bottom of the reservoir). There was a very light amount of insoluble material present. Suggest taking a resample from a suitable sampling port to validate the results before taking any serious maintenance actions. Wear particle analysis indicates that the ferrous black oxides and ferrous red oxides particles are marginal. All other component wear rates are normal. There is a high amount of particulates (2 to 100 microns in size) present in the oil. MPC (Membrane Patch Colorimetry) test indicates a light concentration of varnish present. The water content is negligible. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.





OIL ANALYSIS REPORT

Gas Compression [450305175]

Compressor (HP2) - Lubrication System (S/N Sample Tag XX-23004-S1)

Lube System

Fluid PETRO CANADA TURBOFLO XL32 (10350 LTR)

DIAGNOSIS

A Recommendation

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.

Wear

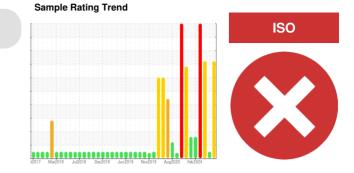
All component wear rates are normal.

Contamination

There is a high amount of particulates (2 to 100 microns in size) present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code.

Fluid Condition

The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC0078295	PC0078288	PC0081649
Sample Date		Client Info		02 Apr 2024	02 Apr 2024	29 Mar 2024
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				SEVERE		SEVERE
CONTAMINAT	ION	method	limit/base	current	history1	history2
Water		WC Method	>0.05	NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>20	<1	0	<1
Chromium	ppm	ASTM D5185(m)	>10	0	0	0
Nickel	ppm	ASTM D5185(m)	>10	0	0	0
Titanium	ppm	ASTM D5185(m)		0	0	0
Silver	ppm	ASTM D5185(m)		0	0	0
Aluminum	ppm	ASTM D5185(m)	>10	0	0	0
Lead	ppm	ASTM D5185(m)	>20	0	0	0
Copper	ppm	ASTM D5185(m)		0	<1	0
Tin	ppm	ASTM D5185(m)	>10	0	0	0
Antimony	ppm	ASTM D5185(m)		0	0	0
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)	0	0	0	0
Barium	ppm	ASTM D5185(m)	0	0	0	0
Maria de la				0		
iviolybdenum	ppm	ASTM D5185(m)	0	0	0	0
,	ppm ppm	ASTM D5185(m) ASTM D5185(m)		0	0	0
Manganese		()		-		
Manganese Magnesium	ppm	ASTM D5185(m)	0 0	0	0	0
Manganese Magnesium Calcium	ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0	0 <1	0 <1	0
Manganese Magnesium Calcium Phosphorus	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5	0 <1 0	0 <1 <1	0 0 0 0
Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5	0 <1 0 2	0 <1 <1 82	0 0 0 3
Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5 0	0 <1 0 2 <1	0 <1 <1 82 2	0 0 0 3 2
Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5 0	0 <1 0 2 <1 631	0 <1 <1 82 2 256	0 0 0 3 2 607
Maganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5 0 750	0 <1 0 2 <1 631 <1	0 <1 <1 82 2 2 56 <1	0 0 3 2 607 <1
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5 0 750 Iimit/base	0 <1 0 2 <1 631 <1 current	0 <1 <1 82 2 2 256 <1 history1	0 0 0 3 2 607 <1 history2
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) Method	0 0 5 0 750 Iimit/base	0 <1 0 2 <1 631 <1 current 0	0 <1 <1 82 2 2 56 <1 <u>history1</u> <1	0 0 0 3 2 607 <1 history2 0
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 5 0 750 Iimit/base >15	0 <1 0 2 <1 631 <1 Current 0 0	0 <1 <1 82 2 2 56 <1 <u>history1</u> <1 <1	0 0 0 3 2 607 <1 history2 0 0
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 5 0 750 750 limit/base >15 >20	0 <1 0 2 <1 631 <1 current 0 0 <1	0 <1 <1 82 2 256 <1 <u>history1</u> <1 <1 0	0 0 0 3 2 607 <1 history2 0 0 0
Maganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 5 0 750 750 Iimit/base >20 Iimit/base	0 <1 0 2 <1 631 <1 current 0 0 <1 0 <1 current 92595	0 <1 <1 82 2 256 <1 history1 <1 <1 0 history1	0 0 0 3 2 607 <1 history2 0 0 0 0 0 history2
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 1 5 0 7 5 0 7 5 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 <1 0 2 <1 631 <1 current 0 0 <1 current 92595 ▲ 17551	0 <1 <1 82 2 256 <1 history1 <1 <1 <1 0 history1 21967 ▲ 5126	0 0 0 3 2 607 <1 history2 0 0 0 0 0 0 history2 122408 ▲ 30044
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 5 0 750 750 Imit/base >15 >20 Imit/base >320 >320 >40	0 <1 0 2 <1 631 <1 current 0 0 <1 current 92595 ▲ 17551 ▲ 511	0 <1 <1 82 2 256 <1 <1 <1 <1 <1 <1 0 0 history1 21967 ▲ 5126 ▲ 352	0 0 0 3 2 607 <1 • • • • • • • • • • • • • • • • • •
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 5 0 750 750 limit/base >15 >20 limit/base >320 >40 >10	0 <1 0 2 <1 631 <1 current 0 0 <1 0 <1 2 <1 2 3 1 2 5 92595 ▲ 17551 ▲ 511 ▲ 114	0 <1 <1 82 2 256 <1 ×1 ×1 <1 <1 <1 0 ×1 21967 ×5126 ×5126 ×352 ×89	0 0 0 3 2 607 <1 history2 0 0 0 0 0 history2 122408 ▲ 30044 ▲ 1148 ▲ 278
Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 5 0 750 750 1 imit/base >15 >20 limit/base >320 >40 >10 >3	0 <1 0 2 <1 631 <1 current 0 0 <1 current 92595 ▲ 17551 ▲ 511	0 <1 <1 82 2 256 <1 <1 <1 <1 <1 <1 0 0 history1 21967 ▲ 5126 ▲ 352	0 0 0 3 2 607 <1 • • • • • • • • • • • • • • • • • •



number of particles (per 1 ml)

OIL ANALYSIS REPORT

mg KOH/g ASTM D974*

Color

Bottom

MPC

Visual*

Visual*

Visual*

Visual*

Visual*

Visual*

Visual*

Visual*

Visual*

ASTM D7279(m)

ASTM D7279(m)

ASTM D2270*

scalar Visual*

0.04

NONE

NONE

NONE

NONE

NONE

NONE

NORML

NORML

>0.05

33.86

5.60

101

0.05

NONE

NONE

NONE

NONE

NONE

NONE

NORML

NORML

NEG

NEG

33.8

5.7

108

0.12

NONE

NONE

NONE

NONE

NONE

NONE

NORML

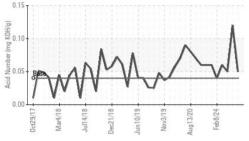
NORML

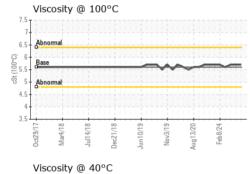
NEG

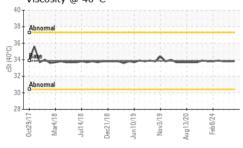
NEG

33.8

A Particle Count	FLUID DEGRA	DATION	
491,520 122,880 = 30,720	Acid Number (AN)	mg KOH/g	
	VISUAL		
7,680 1,920 480 120 30 8 abreemal 20 400:199 16 60 18 690 16 90 16 199 16 20 14 animeters 10 20 12 0 10 20 10 20 10 10 20 10 10 10 20 10 10 10 20 10 10 20 10 10	White Metal	scalar	١
14 95	Yellow Metal	scalar	\
480	Precipitate	scalar	١
² 8 β bræmal 2 − 2 − 48	Silt	scalar	\
0	Debris	scalar	١
	Sand/Dirt	scalar	\
A Particle Trend	Appearance	scalar	١
Ξ ^{120k} 4μm 6μm	Odor	scalar	\
$=$ 100k - 14 μ m	Emulsified Water	scalar	\
80k	Free Water	scalar	\
с 100k	FLUID PROPE	RTIES	
	Visc @ 40°C	cSt	A
0K 11 10 10 10 10 10 10 10 10 10	Visc @ 100°C	cSt	A
0ct29/17 Mar4/18 Jun14/18 Dec21/18 Jun10/19 Aug13/20 Feb8/24	Viscosity Index (VI)	Scale	A
Acid Number	SAMPLE IMAG	ES	
0.15			







|--|

Accreditation No. 1006219	Sample No.	: PC0078295	Received	
ISO 17025:2017	Lab Number	: 02631970	Tested	
Accredited	Unique Number	: 5773123	Diagnosed	
Laboratory	Test Package	: MAR 2 (Additional	l Tests: KV100, T	
To discuss this	s sample report,	contact Customer S	ervice at 1-800-2	
Test denoted (*) outside scope of accreditation, (m) method modifi				

Laboratory

1970	Tested	: 30 Apr 2024
123	Diagnosed	: 30 Apr 2024 - Kevin
2 (Additional T	ests: KV100, TAN	Man, VI)
t Customer Serv	vice at 1-800-268	-2131.
reditation (m) n	nethod modified	(e) tested at externa

: 29 Apr 2024

Marson

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9

Test denoted modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

Scotia Centre, 235 Water Strret St. John`s, NL CA A1C 1B6 Contact: Josh Hynes joshynes@suncor.com

Suncor - Terra Nova Projects

Contact/Location: Josh Hynes - TERHAM 4

Page 4 of	

T: (709)778-3575

F: (709)724-2835

Report Id: TERHAM [WCAMIS] 02631970 (Generated: 04/30/2024 09:37:08) Rev: 1

CALA

5.7 5.7 108 108

0.05

NONE

NONE

NONE

NONE

NONE

VLITE

NEG

NEG

33.8

NORML

NORML

