

PROBLEM SUMMARY

Gas Compression [450312985]

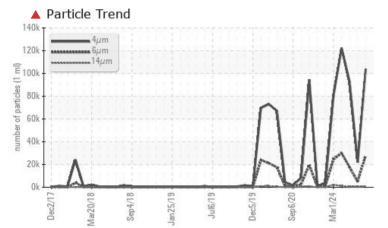
Compressor (HP2) - Lubrication System (S/N Sample Tag XX-23004-S1)

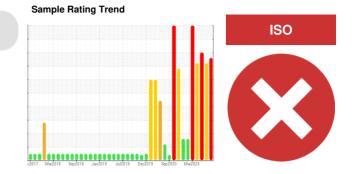
Lube System

Area

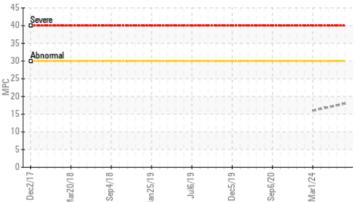
PETRO CANADA TURBOFLO XL32 (10350 LTR)

COMPONENT CONDITION SUMMARY





🔺 Varnish Potential



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. No other corrective action is recommended at this time. 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

THODELMATIC		TILOULI	0			
Sample Status				SEVERE	SEVERE	SEVERE
Particles >6µm		ASTM D7647	>320	A 27968	1 7551	5 126
Particles >14µm		ASTM D7647	>40	4 994	5 11	▲ 352
Particles >21µm		ASTM D7647	>10	A 193	1 14	A 89
Particles >38µm		ASTM D7647	>3	<mark>/</mark> 8	<u> </u>	<u> </u>
Oil Cleanliness		ISO 4406 (c)	>/15/12	4 24/22/17	4 24/21/16	▲ 22/20/16
MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	1 8		

Customer Id: TERHAM Sample No.: PC Lab Number: 02634606 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

RECOMMENDED ACTIONS						
Action	Status	Date	Done By	Description		
Change Filter	MISSED	May 21 2024	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.		
Resample	MISSED	May 21 2024	?	Resample in 30-45 days to monitor this situation.		
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,		
Check Breathers	MISSED	May 21 2024	?	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	MISSED	May 21 2024	?	We advise that you check all areas where contaminants can enter the system.		
Filter Fluid	MISSED	May 21 2024	?	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: 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. 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.



02 Apr 2024 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. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation. The fluid was specified as PETRO CANADA TURBOFLO XL32, however, a fluid match indicates that this fluid is ISO 32 R&O Hydraulic Oil. Please confirm the oil type and grade on your next sample. 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. Che one are 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. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. Serviceable provided that the contaminant(s) can be reduced to acceptable levels.

29 Mar 2024 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. 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.







OIL ANALYSIS REPORT

Gas Compression [450312985]

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

Lube System

Area

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. No other corrective action is recommended at this time. 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

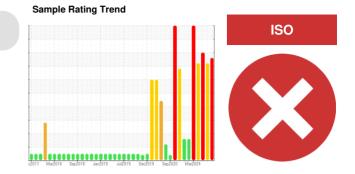
Component wear rates appear to be normal (unconfirmed).

Contamination

There is a 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 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 INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC	PC0078295	PC0078288
Sample Date		Client Info		19 Apr 2024	02 Apr 2024	02 Apr 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	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	<1	0
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)	>20	0	0	<1
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
ADDITIVES Boron	ppm	method ASTM D5185(m)	limit/base	current 0	history1 0	history2 0
	ppm ppm		0			
Boron		ASTM D5185(m)	0	0	0	0
Boron Barium	ppm	ASTM D5185(m) ASTM D5185(m)	0 0 0	0 0 0 0	0	0 0 0 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0	0 0 0	0 0 0	0 0 0
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0	0 0 0 <1 0	0 0 0 <1 0	0 0 0 <1 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 5	0 0 0 <1	0 0 0 <1	0 0 0 <1 <1 <1 82
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	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 0 0 0 5	0 0 0 <1 0 3 1	0 0 0 <1 0 2 <1	0 0 0 <1 <1 <1 82 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	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) ASTM D5185(m)	0 0 0 0 0 5	0 0 0 <1 0 3 1 632	0 0 0 <1 0 2	0 0 0 <1 <1 <1 82
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	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 0 0 0 5 0	0 0 0 <1 0 3 1	0 0 0 <1 0 2 <1	0 0 0 <1 <1 <1 82 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm 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) ASTM D5185(m)	0 0 0 0 0 5 0	0 0 0 <1 0 3 1 632 <1	0 0 0 <1 0 2 <1 631	0 0 0 <1 <1 <1 82 2 2 556
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm 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) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 5 0 750	0 0 0 <1 0 3 1 632 <1	0 0 0 <1 0 2 <1 631 <1	0 0 0 <1 <1 <1 82 2 2 56 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Chosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm 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) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 5 0 750 750	0 0 0 <1 0 3 1 632 <1 current	0 0 0 <1 0 2 <1 631 <1 history1	0 0 0 <1 <1 <1 82 2 2 256 <1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 5 0 750 750	0 0 0 <1 0 3 1 632 <1 current 0	0 0 0 <1 0 2 <1 631 <1 history1 0	0 0 0 <1 <1 <1 82 2 2 256 <1 256 <1 history2 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 0 0 0 5 0 750 750 Imit/base >15	0 0 0 <1 0 3 1 632 <1 Current 0 0 0	0 0 0 <1 0 2 <1 631 <1 history1 0 0	0 0 0 <1 <1 <1 82 2 2 256 <1 256 <1 history2 <1 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 5 0 750 750 limit/base >15	0 0 0 <1 0 3 1 632 <1 current 0 0 0	0 0 0 <1 0 2 <1 631 <1 history1 0 0 <1	0 0 0 <1 <1 <1 82 2 2 56 <1 bistory2 <1 <1 <1 <1 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 5 0 750 1 5 5 5 5 5 5 5 5 5 5 5 5 5	0 0 0 3 1 632 <1 current 0 0 0 0 0	0 0 0 <1 0 2 <1 631 <1 history1 0 0 <1 history1	0 0 0 4 1 4 1 82 2 2 2 5 6 4 1 history2 4 1 0 0 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 0 5 0 750 1 5 5 5 5 5 5 5 5 5 5 5 5 5	0 0 0 3 1 632 <1 current 0 0 0 0 current 103853	0 0 0 2 1 0 2 2 1 631 4 1 history1 0 0 0 4 1 history1 92595	0 0 0 4 1 4 1 8 2 2 2 5 6 4 1 history2 4 1 4 0 0 history2 2 1967
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEANI Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 5 0 750 750 limit/base >15 >20 limit/base >20 limit/base	0 0 0 3 1 632 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 2 1 0 2 2 1 631 3 1 3 1 0 0 0 3 1 history1 92595 ▲ 17551	0 0 0 0 <1 <1 <1 82 2 2 256 <1 256 <1 V V V V V V V V V V V V V V V V V V
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Sodium Sodium Potassium FLUID CLEANI Particles >4µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185(m) ASTM D5185(m)	0 0 0 0 5 0 750 750 limit/base >15 >20 limit/base >20 limit/base	0 0 0 3 1 632 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 2 1 0 2 2 1 631 4 1 631 4 1 0 0 0 4 1 92595 1 92595 ▲ 17551 ▲ 511	0 0 0 1 1 1 1 82 2 2 2 2 2 2 2 5 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Boron Barium Molybdenum 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 ppm ppm TS	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 0 5 0 750 750 750 750 750 750 750	0 0 0 3 3 1 632 <1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 2 1 0 2 2 1 631 631 631 631 631 6 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8	0 0 0 1 1 1 1 1 2 2 2 2 2 2 2 2 2 1 2 1



OIL ANALYSIS REPORT

1,520 T		nt			T ²⁶
2,880					-24
0,720-					-22 80 +
7,680-					-20 06:1999 Cleanliness Code -14 -12 ss Code -12 -10 -10
480 -					-18 1999
120-					-16 Clean
30-					-12 liness
8 Severa	al				10 8
2					×8 °
0 _{4μ}	6µ	14µ	21µ	38 ^µ	71µ
	icle Trer				
100k -					AL
80k	Mar20/18	Jan 25/19	61/SluL	Dec5/19 Sep6/20	Mari/24
Ok LUZ Dec 71/2	81/02/aeu		61/8luc	Dec5/19 Sep 6/20	Mari/24
ok ↓	nish Pote		91/3huC	Dec5/19 Sep6/20	Mar1/24
Ok LUZ Dec 71/2	nish Pote		6L/3luL	Sep6/20 Sep6/20	Mari 124
ok LUZ200 ▲ Var	nish Pote		er/aluc	Sep6/20 Sep6/20	Mari124

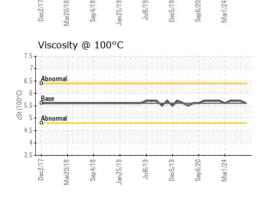
FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.04	0.05	0.05	0.12
MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	18		
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	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*	>0.05	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPER	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	33.86	33.8	33.8	33.8
Visc @ 100°C	cSt	ASTM D7279(m)	5.60	5.6	5.7	5.7
Viscosity Index (VI)	Scale	ASTM D2270*	101	102	108	108
SAMPLE IMAG	ES	method	limit/base	current	history1	history2

no image no image

MPC

Color

Bottom





Dec2/17

0.15

(mg KOH/g)

Acid Number (

0.00

Mar20/18

Acid Number

Sep4/18 an 25/19 B1/3



: PC Sample No. Lab Number : 02634606 Unique Number : 5775759

6/20

lar1/24

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Received : 10 May 2024 Tested : 24 May 2024 Diagnosed : 24 May 2024 - Kevin Marson Test Package : MAR 2 (Additional Tests: KV100, MPC, TAN Man, VI)

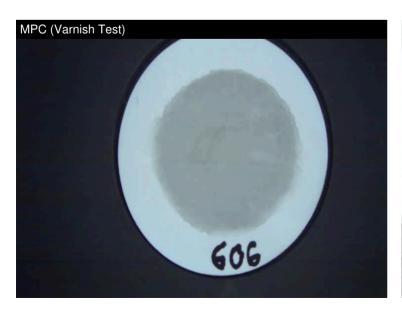
To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

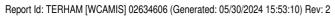
Suncor - Terra Nova Projects Scotia Centre, 235 Water Strret St. John`s, NL

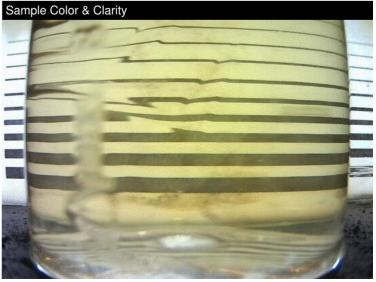
CA A1C 1B6 Contact: Josh Hynes joshynes@suncor.com T: (709)778-3575 F: (709)724-2835

Report Id: TERHAM [WCAMIS] 02634606 (Generated: 05/30/2024 15:53:02) Rev: 2

Contact/Location: Josh Hynes - TERHAM Page 4 of 6







Contact/Location: Josh Hynes - TERHAM Page 5 of 6

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