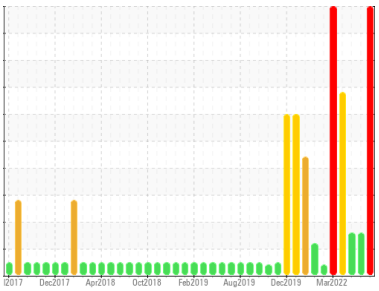
PROBLEM SUMMARY

Sample Rating Trend

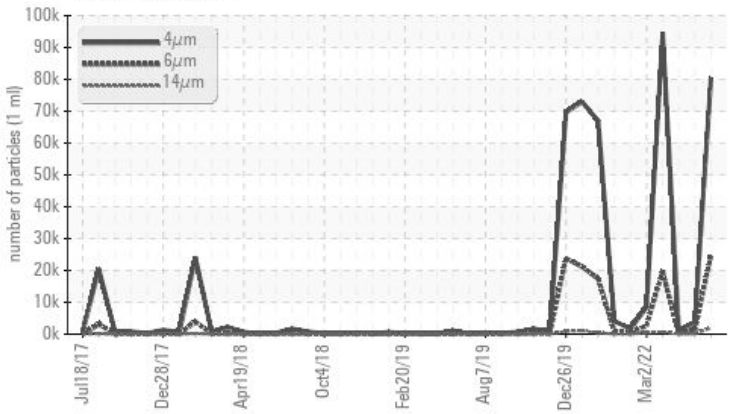


ISO

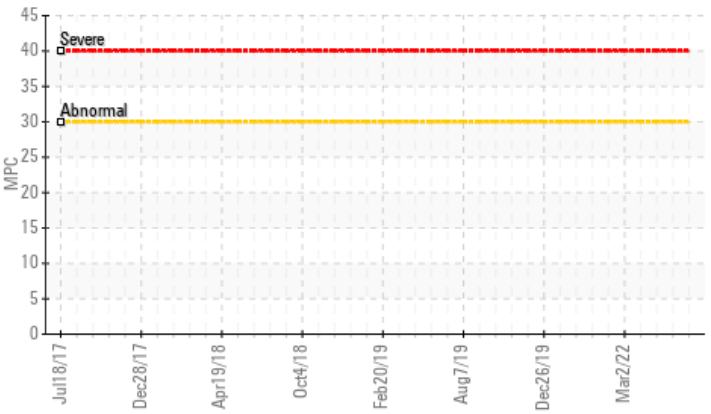
Area
Gas Compression
Machine Id
Compressor (HP2) - Lubrication System (S/N Sample Tag XX-23004-S1)
Component
Lube System
Fluid
PETRO CANADA TURBOFLO XL32 (10350 LTR)

COMPONENT CONDITION SUMMARY

▲ Particle Trend



▲ 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. 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.

PROBLEMATIC TEST RESULTS

Sample Status				SEVERE	ABNORMAL	ATTENTION
Ferrous Black Oxides	Scale 0-10	ASTM D7684*		▲ 3		
Ferrous Red Oxides	Scale 0-10	ASTM D7684*		▲ 3		
Particles >6µm		ASTM D7647	>320	▲ 24570	▲ 1147	● 432
Particles >14µm		ASTM D7647	>40	▲ 1988	▲ 103	● 52
Particles >21µm		ASTM D7647	>10	▲ 620	▲ 24	● 16
Particles >38µm		ASTM D7647	>3	▲ 57	3	1
Particles >71µm		ASTM D7647	>3	▲ 6	1	0
Oil Cleanliness		ISO 4406 (c)	>--/15/12	▲ 24/22/18	▲ 19/17/14	● 17/16/13
MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	▲ 16	---	---

Customer Id: TERHAM
Sample No.: PC0082750
Lab Number: 02622711
Test Package: AOM 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Bill Quesnel CLS,OMA II,MLA-III,LLA-I +1 (289)291-4641 x4641
Bill.Quesnel@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	---	---	?	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

ISO

08 Feb 2024 Diag: Kevin Marson

We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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). There is a moderate amount of particulates (2 to 100 microns in size) present in the oil. The system cleanliness is above 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.

view report

ISO

29 Jan 2024 Diag: Kevin Marson

We recommend you service the filters on this component. Resample at the next service interval to monitor.All component wear rates are normal. There is a light amount of silt (particulates < 14 microns in size) present in the oil. The water content is negligible. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

ISO

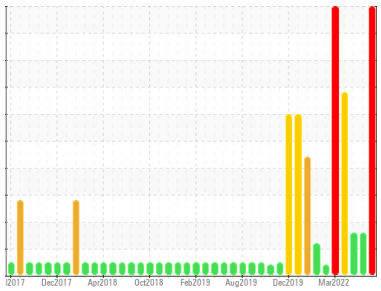
05 Jan 2024 Diag: Kevin Marson

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 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.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Area
Gas Compression
Machine Id
Compressor (HP2) - Lubrication System (S/N Sample Tag XX-23004-S1)
Component
Lube System
Fluid
PETRO CANADA TURBOFLO XL32 (10350 LTR)

DIAGNOSIS

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. 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

Wear particle analysis indicates that the ferrous black oxides and ferrous red oxides particles are marginal. All other component wear rates are normal.

Contaminants

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.

Oil 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 INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**PC0082750**	PC	PC0076669
Sample Date		Client Info		**01 Mar 2024**	08 Feb 2024	29 Jan 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**	ABNORMAL	ATTENTION

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**0**	---	---
Iron	ppm	ASTM D5185(m)	>20	**<1**	0	0
Chromium	ppm	ASTM D5185(m)	>10	**0**	0	0
Nickel	ppm	ASTM D5185(m)	>10	**<1**	0	0
Titanium	ppm	ASTM D5185(m)		**0**	0	0
Silver	ppm	ASTM D5185(m)		**0**	0	0
Aluminum	ppm	ASTM D5185(m)	>10	**<1**	<1	<1
Lead	ppm	ASTM D5185(m)	>20	**0**	0	0
Copper	ppm	ASTM D5185(m)	>20	**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

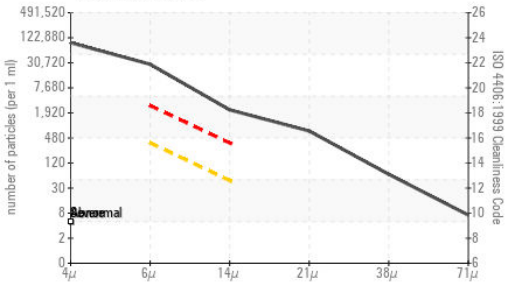
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	0	**0**	0	0
Barium	ppm	ASTM D5185(m)	0	**0**	0	0
Molybdenum	ppm	ASTM D5185(m)	0	**0**	0	0
Manganese	ppm	ASTM D5185(m)	0	**0**	0	0
Magnesium	ppm	ASTM D5185(m)	0	**<1**	<1	<1
Calcium	ppm	ASTM D5185(m)	0	**<1**	8	<1
Phosphorus	ppm	ASTM D5185(m)	5	**2**	3	2
Zinc	ppm	ASTM D5185(m)	0	**<1**	2	1
Sulfur	ppm	ASTM D5185(m)	750	**667**	692	657
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>15	**<1**	0	0
Sodium	ppm	ASTM D5185(m)		**0**	0	0
Potassium	ppm	ASTM D5185(m)	>20	**<1**	<1	<1
Water	%	ASTM D6304*	>0.05	**0.003**	---	0.002
ppm Water	ppm	ASTM D6304*	>500	**27**	---	23

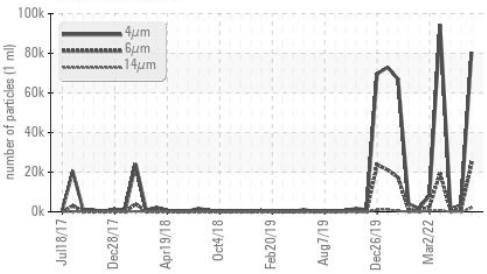
INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*		**0**	---	---
Nitration	Abs/cm	ASTM D7624*		**1.9**	---	---
Sulfation	Abs/.1mm	ASTM D7415*		**10.7**	---	---

OIL ANALYSIS REPORT

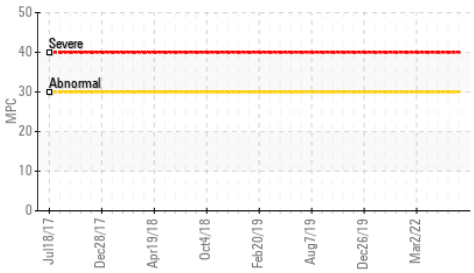
Particle Count



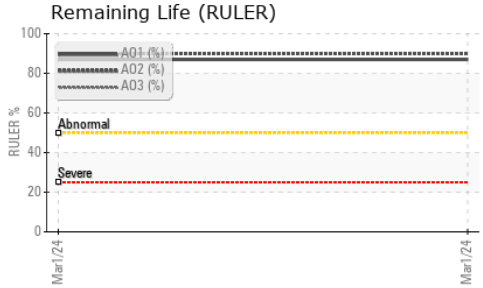
Particle Trend



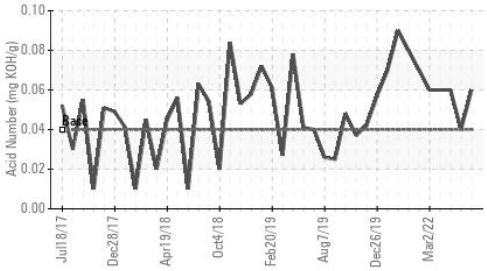
Varnish Potential



Remaining Life (RULER)



Acid Number

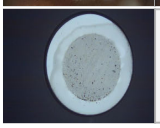


FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		**80490**	3526	1227
Particles >6µm	ASTM D7647	>320	▲ **24570**	▲ 1147	● 432
Particles >14µm	ASTM D7647	>40	▲ **1988**	▲ 103	● 52
Particles >21µm	ASTM D7647	>10	▲ **620**	▲ 24	● 16
Particles >38µm	ASTM D7647	>3	▲ **57**	3	1
Particles >71µm	ASTM D7647	>3	▲ **6**	1	0
Oil Cleanliness	ISO 4406 (c)	>--/15/12	▲ **24/22/18**	▲ 19/17/14	● 17/16/13

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*		**1.9**	---	---
Acid Number (AN)	mg KOH/g	ASTM D974*	0.04	**0.06**	0.04	0.06
Anti-Oxidant 1	%	ASTM D6971*	<25	**87**	---	---
Anti-Oxidant 2	%	ASTM D6971*	<25	**90**	---	---
MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	▲ **16**	---	---

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	**LIGHT**	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	.2%
Free Water	scalar	Visual*		**NEG**	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	33.86	**33.9**	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 IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					
MPC				*no image*	*no image*

ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : PC0082750
Lab Number : 02622711
Unique Number : 5747830
Test Package : AOM 2

Received : 18 Mar 2024
Tested : 22 Mar 2024
Diagnosed : 22 Mar 2024 - Bill Quesnel

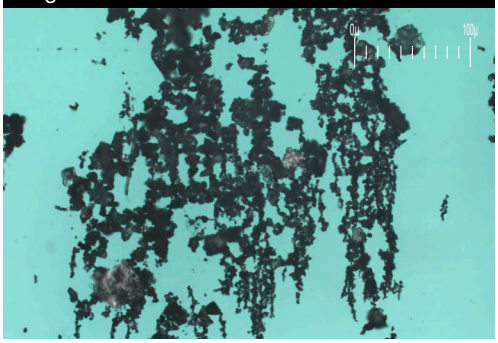
To discuss this sample report, contact Customer Service at 1-800-268-2131.
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
Validity of results and interpretation are based on the sample and information as supplied.

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

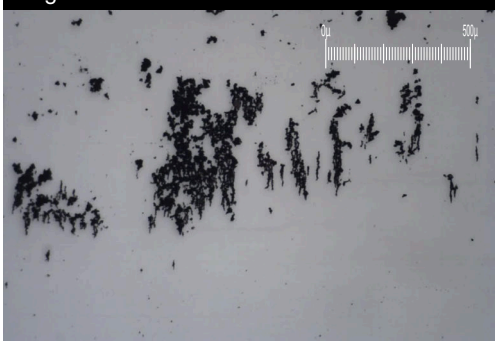
FERROGRAPHY REPORT

Area
Gas Compression
Machine Id
Compressor (HP2) - Lubrication System (S/N Sample Tag XX-23004-S1)
Component
Lube System
Fluid
PETRO CANADA TURBOFLO XL32 (10350 LTR)

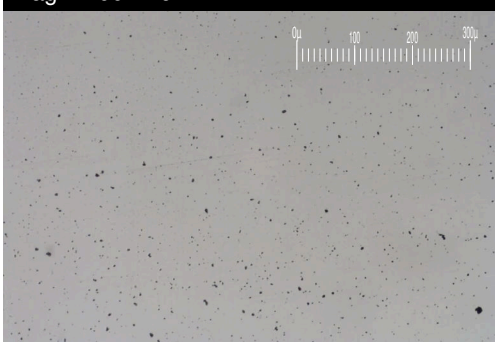
Magn: 200x Illum: BC



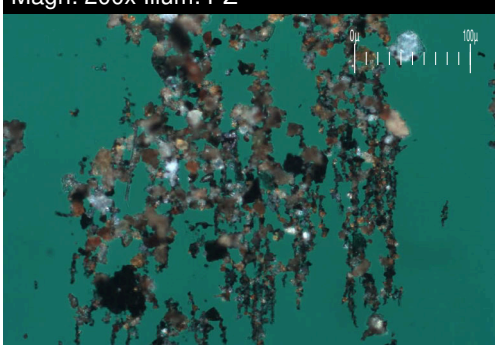
Magn: 50x Illum: RW



Magn: 100x Illum: RW



Magn: 200x Illum: PZ

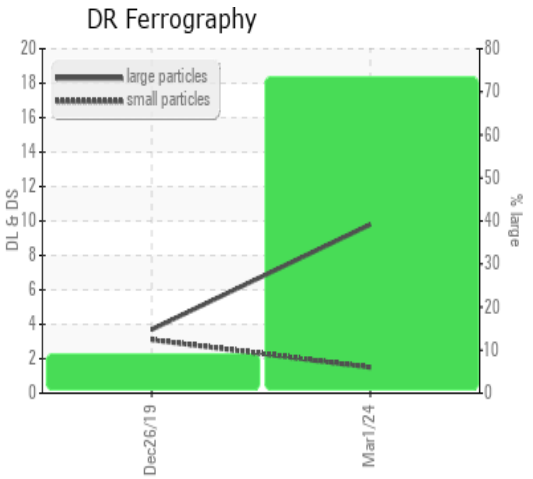


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		9.8	---	---
Small Particles		DR-Ferr*		1.5	---	---
Total Particles		DR-Ferr*	>---	11.3	---	---
Large Particles Percentage	%	DR-Ferr*		73.5	---	---
Severity Index		DR-Ferr*		81	---	---

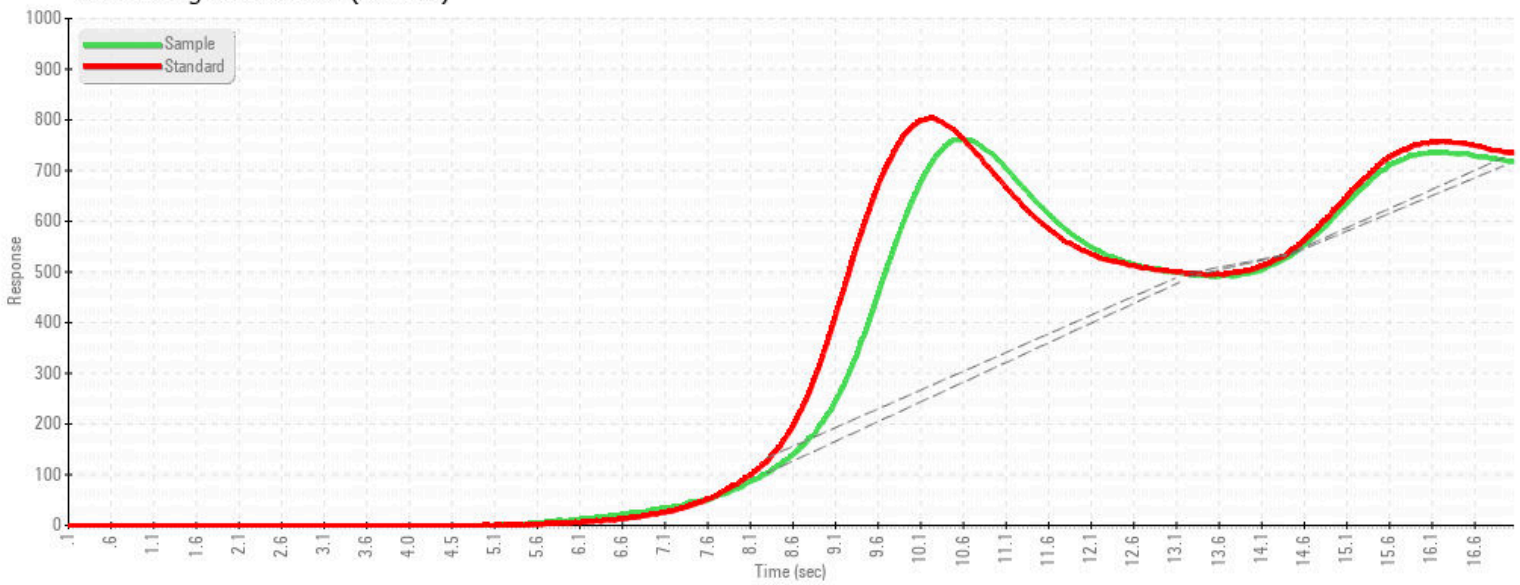
FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		2		
Ferrous Sliding	Scale 0-10	ASTM D7684*		2		
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		1		
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*		3		
Ferrous Red Oxides	Scale 0-10	ASTM D7684*		3		
Ferrous Corrosive	Scale 0-10	ASTM D7684*		2		
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*		3		
Sand/Dirt	Scale 0-10	ASTM D7684*		2		
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*				

WEAR

Wear particle analysis indicates that the ferrous black oxides and ferrous red oxides particles are marginal. All other component wear rates are normal.



Remaining Useful Life (RULER)



MPC (Varnish Test)

Sample Color & Clarity