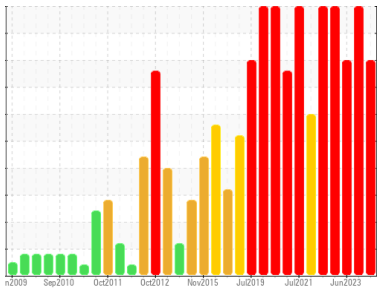
PROBLEM SUMMARY

Sample Rating Trend



DEGRADATION

Area

(ZONE3) BRUCE A/0A/34340

Machine Id

0A-34340-MV314-ActuatorHydFluid

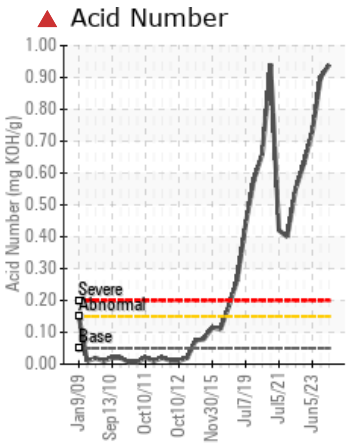
Component

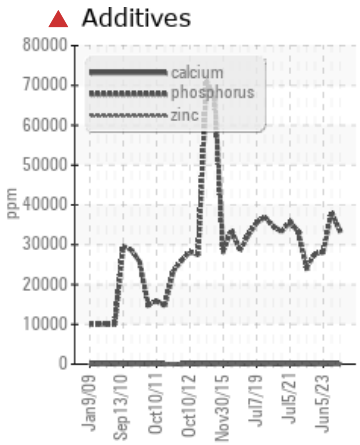
Hydraulic System

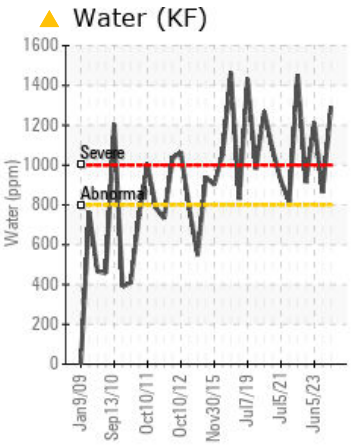
Fluid

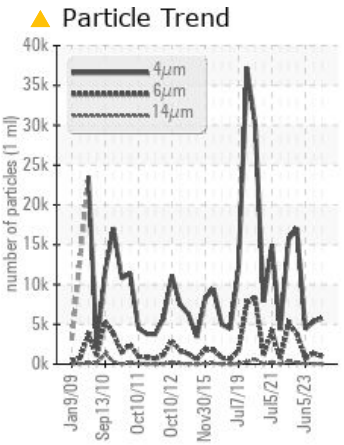
SUPRESTA FYRQUEL EHC-S (8 GAL)

COMPONENT CONDITION SUMMARY





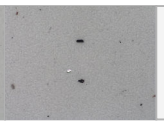




RECOMMENDATION

We advise that you check for the source of water entry. 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. The oil is near the end of it`s useful service life, recommend schedule an oil change. We recommend you service the filters on this component. We recommend an early resample to monitor this condition.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	SEVERE	SEVERE
Zinc	ppm	ASTM D5185(m)		▲ **91**	▲ 79	▲ 67
Water	%	ASTM D6304*	>0.08	▲ **0.129**	0.086	▲ 0.121
ppm Water	ppm	ASTM D6304*	>800	▲ **1293**	863	▲ 1212.9
Particles >6µm		ASTM D7647	>160	▲ **986**	▲ 1368	▲ 810
Oil Cleanliness		ISO 4406 (c)	>--/14/11	▲ **20/17/12**	▲ 20/18/13	▲ 19/17/13
Acid Number (AN)	mg KOH/g	ASTM D974*	0.05	▲ **0.94**	▲ 0.90	▲ 0.73
PrtFilter						*no image*

Customer Id: BRUTIV
Sample No.: WC
Lab Number: 02643304
Test Package: IND 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
Service/change Fluid	---	---	?	The oil is near the end of it's useful service life, recommend schedule an oil change.
Change Filter	---	---	?	We recommend you service the filters on this component.
Resample	---	---	?	We recommend an early resample to monitor this condition.
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 Water Access	---	---	?	We advise that you check for the source of water entry.
Check Seals	---	---	?	Check seals and/or filters for points of contaminant entry.

HISTORICAL DIAGNOSIS

DEGRADATION

22 Nov 2023 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 oil from the component if this has not already been done. We recommend you service the filters on this component. Resample in 30-45 days to monitor this situation.Wear particle analysis indicates that the ferrous cutting particles are abnormal. Cutting wear particles are caused by either hard protuberances (mis-aligned components, etc.), or abrasives entering the system and embedding themselves in softer materials (sand, etc.), and gouging out mating surfaces. 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. Acid Number (AN) is severely high. Zinc ppm levels are severely high. Calcium ppm levels are notably high. The high AN level of the oil indicates the presence of oxi-polymerized products. The AN level is much higher than the recommended limit. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

view report

DEGRADATION

05 Jun 2023 Diag: Kevin Marson

We advise that you check for the source of water entry. 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 advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this oil. 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 specify the brand, type, and viscosity of the oil on your next sample.All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. There is a moderate amount of particulates (2 to 100 microns in size) present in the oil. There is a moderate concentration of water present in the oil. The system cleanliness is above the acceptable limit for the target ISO 4406 cleanliness code. Acid Number (AN) is severely high. Zinc ppm levels are severely high. Calcium ppm levels are notably high. The high AN level of the oil indicates the presence of oxi-polymerized products. The AN level is much higher than the recommended limit. The oil is no longer serviceable.

view report

DEGRADATION

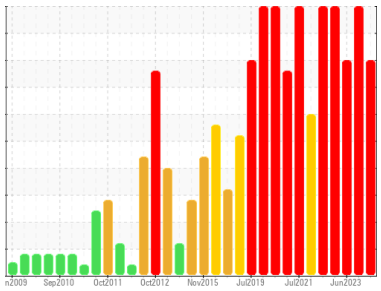
21 Nov 2022 Diag: Kevin Marson

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 advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this oil. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. Resample in 30-45 days to monitor this situation.All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. Particles >14µm are severely high. Particles >21µm are severely high. Particles >6µm are severely high. Water contamination levels are abnormally high. ppm Water contamination levels are abnormally high. Particles >38µm are abnormally high. There is a moderate concentration of water present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. Acid Number (AN) is severely high. Zinc ppm levels are severely high. Calcium ppm levels are abnormally high. The high AN level of the oil indicates the presence of oxi-polymerized products. The AN level is much higher than the recommended limit. The oil is no longer serviceable.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



DEGRADATION

Area
(ZONE3) BRUCE A/0A/34340
Machine Id
0A-34340-MV314-ActuatorHydFluid
Component
Hydraulic System
Fluid
SUPRESTA FYRQUEL EHC-S (8 GAL)

DIAGNOSIS

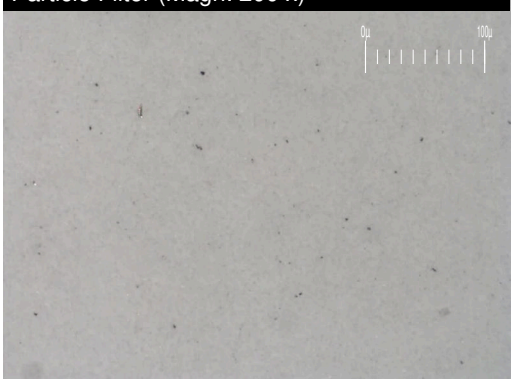
Recommendation
We advise that you check for the source of water entry. Check seals and/or filters for points of contaminant entry. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. The oil is near the end of it`s useful service life, recommend schedule an oil change. We recommend you service the filters on this component. We recommend an early resample to monitor this condition.

Wear
All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.

Contaminants
There is a moderate amount of silt (particulates < 14 microns in size) present in the oil. There is a moderate concentration of water present in the oil. The system cleanliness is above the acceptable limit for the target ISO 4406 cleanliness code.

Oil Condition
Acid Number (AN) is severely high. Zinc ppm levels are severely high. Calcium ppm levels are notably high. The high AN level of the oil indicates the presence of oxi-polymerized products. The AN level is much higher than the recommended limit. The oil is no longer serviceable.

Particle Filter (Magn: 200 x)



SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC**	WC0815775	WC0801502
Sample Date		Client Info		**03 Jun 2024**	22 Nov 2023	05 Jun 2023
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

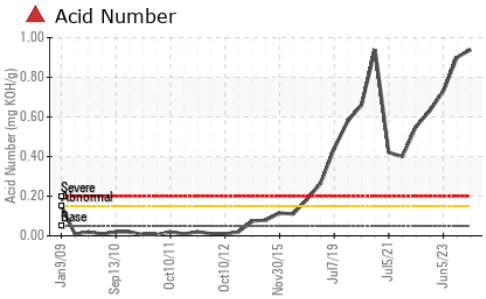
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>5	**2**	2	1
Chromium	ppm	ASTM D5185(m)	>5	**0**	0	0
Nickel	ppm	ASTM D5185(m)	>5	**<1**	0	0
Titanium	ppm	ASTM D5185(m)	>5	**0**	0	0
Silver	ppm	ASTM D5185(m)		**0**	0	0
Aluminum	ppm	ASTM D5185(m)	>5	**<1**	<1	0
Lead	ppm	ASTM D5185(m)	>5	**<1**	<1	0
Copper	ppm	ASTM D5185(m)	>5	**3**	2	2
Tin	ppm	ASTM D5185(m)	>5	**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)		**1**	<1	<1

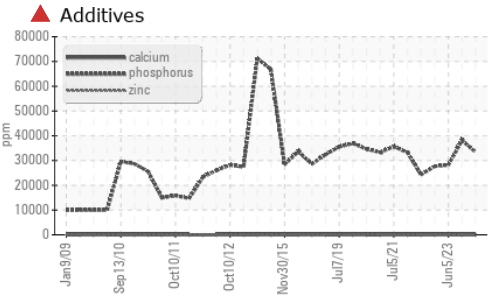
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**<1**	<1	<1
Barium	ppm	ASTM D5185(m)		**0**	0	0
Molybdenum	ppm	ASTM D5185(m)		**0**	0	0
Manganese	ppm	ASTM D5185(m)		**<1**	0	<1
Magnesium	ppm	ASTM D5185(m)		**2**	2	2
Calcium	ppm	ASTM D5185(m)		● **11**	● 9	● 10
Phosphorus	ppm	ASTM D5185(m)		**33434**	38091	28140
Zinc	ppm	ASTM D5185(m)		▲ **91**	▲ 79	▲ 67
Sulfur	ppm	ASTM D5185(m)		**4**	0	3
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

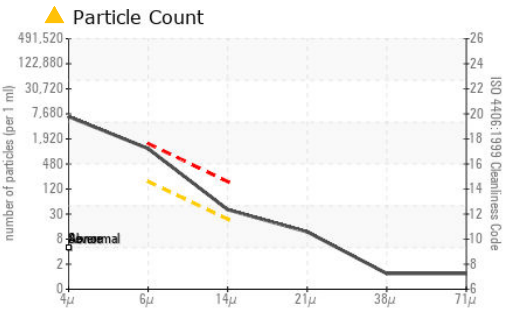
CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>5	**<1**	<1	1
Sodium	ppm	ASTM D5185(m)	>5	**3**	3	<1
Potassium	ppm	ASTM D5185(m)	>20	**<1**	1	<1
Water	%	ASTM D6304*	>0.08	▲ **0.129**	0.086	▲ 0.121
ppm Water	ppm	ASTM D6304*	>800	▲ **1293**	863	▲ 1212.9

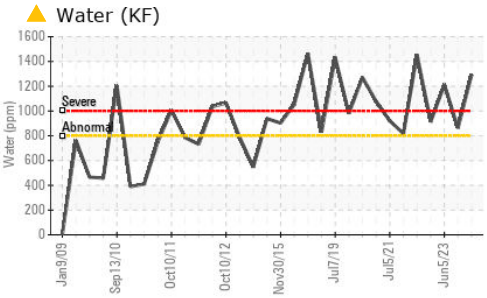
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**5733**	5382	4385
Particles >6µm		ASTM D7647	>160	▲ **986**	▲ 1368	▲ 810
Particles >14µm		ASTM D7647	>20	● **34**	▲ 76	▲ 43
Particles >21µm		ASTM D7647	>4	● **10**	▲ 16	▲ 11
Particles >38µm		ASTM D7647	>3	**1**	1	0
Particles >71µm		ASTM D7647	>3	**1**	0	0
Oil Cleanliness		ISO 4406 (c)	>--/14/11	▲ **20/17/12**	▲ 20/18/13	▲ 19/17/13

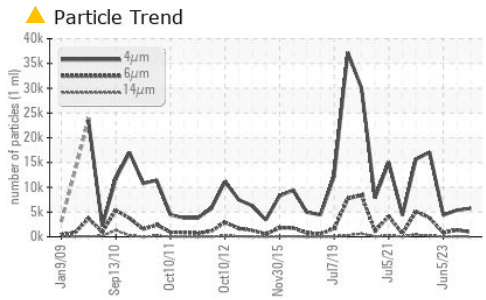
OIL ANALYSIS REPORT









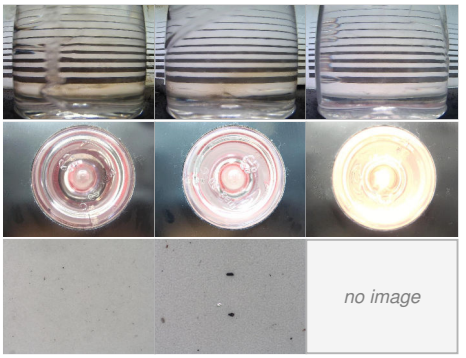


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.05	▲ **0.94**	▲ 0.90	▲ 0.73

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	**NONE**	NONE	NONE
Sand/Dirt	scalar	Visual*	NONE	**VLITE**	NONE	NONE
Appearance	scalar	Visual*	NORML	**NORML**	NORML	NORML
Odor	scalar	Visual*	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	Visual*	>0.08	**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)	47	**42.5**	43.1	45.1

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					
PrtFilter					



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC
Lab Number : 02643304
Unique Number : 5800843
Test Package : IND 2 (Additional Tests: A-FERR, BottomAnalysis, DR-FERR, FILTERPATCH, PrtFilter, TAN, Visc)

Received : 20 Jun 2024
Tested : 26 Jun 2024
Diagnosed : 26 Jun 2024 - Kevin Marson

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.

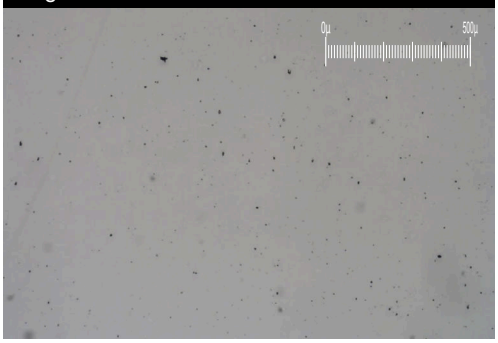
Bruce Power - Bruce A PdM
P.O.Box 1540, 177 Tie Road,, RM-222 U2 Column 2N11 615`
Tiverton, ON
CA N0G 2T0
Contact: Andrew Roffey
andrew.roffey@brucepower.com
T: (519)361-2673 x:17186
F:

FERROGRAPHY REPORT

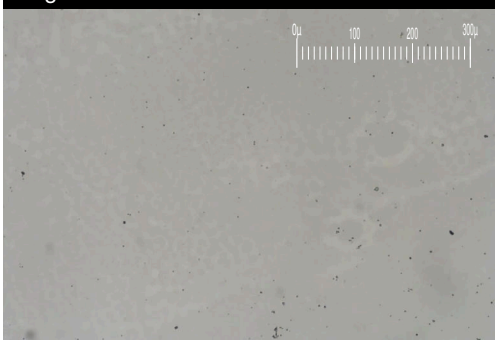
Area
(ZONE3) BRUCE A/0A/34340
Machine Id
0A-34340-MV314-ActuatorHydFluid
Component
Hydraulic System
Fluid
SUPRESTA FYRQUEL EHC-S (8 GAL)

Magn: 200x Illum: BC

Magn: 50x Illum: RW



Magn: 100x Illum: RW

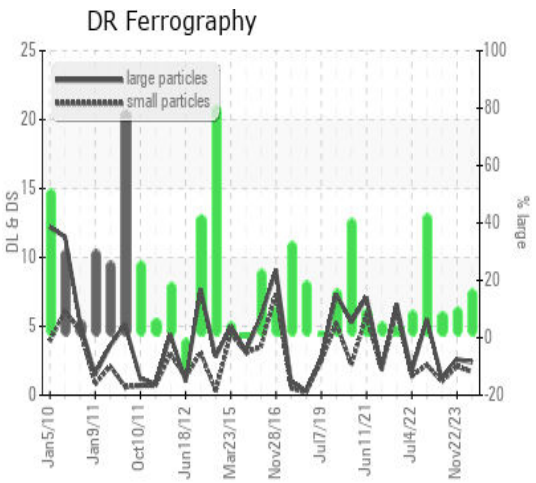


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**2.4**	2.6	1.2
Small Particles		DR-Ferr*		**1.7**	2.1	1.0
Total Particles		DR-Ferr*	>---	**4.1**	4.7	2.2
Large Particles Percentage	%	DR-Ferr*		**17.1**	10.6	9.1
Severity Index		DR-Ferr*		**2**	1	0

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

WEAR

All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.



This page left intentionally blank