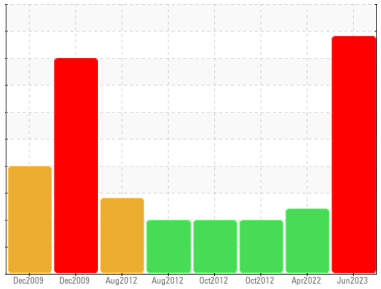
PROBLEM SUMMARY

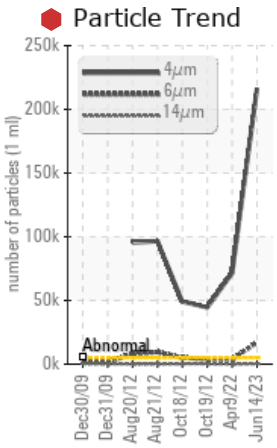
Area
(ZONE3) BRUCE B/0B/75120
Machine Id
0B-75120-CP4-Lube Oil Level
Component
Bulk Fluid Tank
Fluid
MOBIL SHC RARUS 68 (--- GAL)

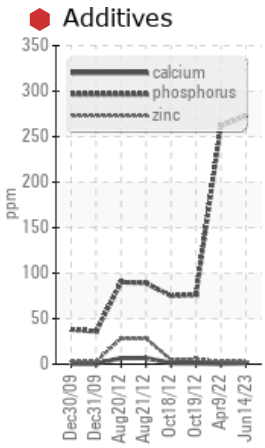
Sample Rating Trend

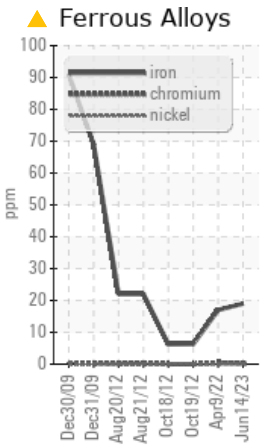


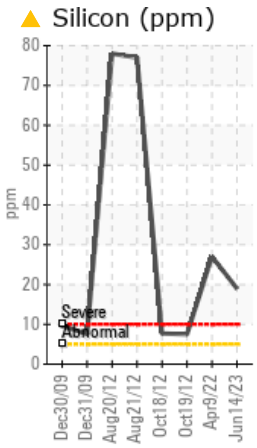
ISO

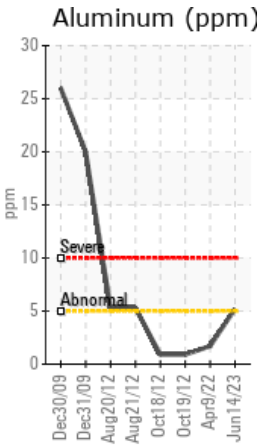
COMPONENT CONDITION SUMMARY











RECOMMENDATION

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where dirt 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 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.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	SEVERE	ABNORMAL
Iron	ppm	ASTM D5185(m)	>10	▲ **19**	17	6
Ferrous Rubbing	Scale 0-10	ASTM D7684*		▲ **7**	4	3
Phosphorus	ppm	ASTM D5185(m)		⬢ **273**	262	76
Silicon	ppm	ASTM D5185(m)	>5	▲ **19**	27	8
Particles >4µm		ASTM D7647	>5000	⬢ **216501**	⬢ 71473	44552
Particles >6µm		ASTM D7647	>1300	⬢ **16952**	▲ 4015	▲ 3912
Particles >14µm		ASTM D7647	>320	▲ **332**	33	▲ 214
Particles >21µm		ASTM D7647	>80	▲ **127**	5	▲ 60
Oil Cleanliness		ISO 4406 (c)	>19/17/15	⬢ **25/21/16**	⬢ 23/19/12	▲ 23/19/15

Customer Id: BRUTIV
Sample No.: WC0744565
Lab Number: 02565313
Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
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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 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 dirt can enter the system.
Check Seals	---	---	?	Check seals and/or filters for points of contaminant entry.
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

09 Apr 2022 Diag: Kevin Marson

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. 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 ESSO COMPRESSOR OIL 68, however, a fluid match indicates that this fluid is ISO 68 Synthetic (PAG) Fire-Resistant Fluid. Please confirm the oil type and grade 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. Particles >4µm are severely high. Particles >6µm are abnormally high. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

ADDITIVES

19 Oct 2012 Diag: Bill Quesnel

The filter change at the time of sampling has been noted. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. Particles >6µm are abnormally high. Particles >14µm and particles >21µm are notably high. The water content is negligible. Additive levels indicate the addition of a different brand, or type of oil. The TAN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

ADDITIVES

18 Oct 2012 Diag: Bill Quesnel

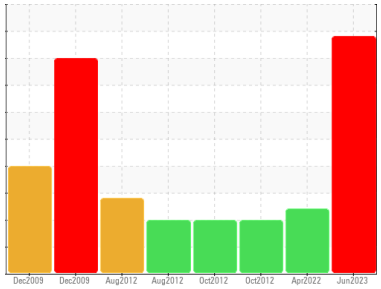
The filter change at the time of sampling has been noted. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. Particles >6µm are abnormally high. Particles >14µm and particles >21µm are notably high. The water content is negligible. Additive levels indicate the addition of a different brand, or type of oil. The TAN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

OIL ANALYSIS REPORT

Area
(ZONE3) BRUCE B/0B/75120
Machine Id
0B-75120-CP4-Lube Oil Level
Component
Bulk Fluid Tank
Fluid
MOBIL SHC RARUS 68 (--- GAL)

Sample Rating Trend



ISO

DIAGNOSIS

Recommendation

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where dirt 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 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.

Wear

Iron ppm levels are abnormal. Wear particle analysis indicates that the ferrous rubbing particles are abnormal. The diagnosis reflects updated information on this component.

Contaminants

There is a high amount of silt (particulates < 14 microns in size) present in the oil. There is a moderate concentration of dirt present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. High amount of ingressed dirt has caused abrasive wear to the component.

Oil Condition

Phosphorus ppm levels are severely high. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0744565**	WC0638217	WC22097303
Sample Date		Client Info		**14 Jun 2023**	09 Apr 2022	19 Oct 2012
Machine Age	hrs	Client Info		**0**	0	0
Oil Age	hrs	Client Info		**0**	0	0
Oil Changed		Client Info		**N/A**	N/A	Changed
Sample Status				**SEVERE**	SEVERE	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**1**	---	---
Iron	ppm	ASTM D5185(m)	>10	▲ **19**	17	6
Chromium	ppm	ASTM D5185(m)	>5	**<1**	<1	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	**5**	2	<1
Lead	ppm	ASTM D5185(m)	>5	**<1**	0	0
Copper	ppm	ASTM D5185(m)	>5	**<1**	<1	<1
Tin	ppm	ASTM D5185(m)	>5	**0**	<1	<1
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

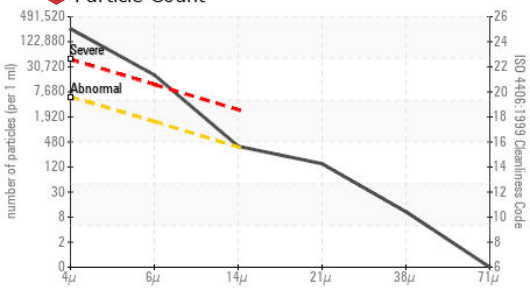
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**<1**	<1	0
Barium	ppm	ASTM D5185(m)		**0**	0	<1
Molybdenum	ppm	ASTM D5185(m)		**<1**	0	0
Manganese	ppm	ASTM D5185(m)		**1**	<1	<1
Magnesium	ppm	ASTM D5185(m)		**0**	0	0
Calcium	ppm	ASTM D5185(m)		**1**	▲ <1	▲ 1
Phosphorus	ppm	ASTM D5185(m)		⬢ **273**	262	76
Zinc	ppm	ASTM D5185(m)		**2**	▲ 3	▲ 6
Sulfur	ppm	ASTM D5185(m)		**243**	▲ 291	1690
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>5	▲ **19**	27	8
Sodium	ppm	ASTM D5185(m)	>5	**0**	0	2
Potassium	ppm	ASTM D5185(m)	>20	**<1**	0	0
Water	%	ASTM D6304*	>0.005	**0.003**	0.001	0.001
ppm Water	ppm	ASTM D6304*	>50	**25.3**	4.5	10.0

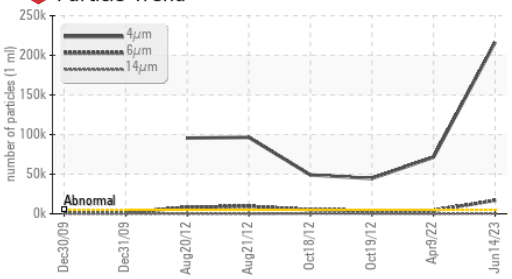
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>5000	⬢ **216501**	⬢ 71473	44552
Particles >6µm		ASTM D7647	>1300	⬢ **16952**	▲ 4015	▲ 3912
Particles >14µm		ASTM D7647	>320	▲ **332**	33	▲ 214
Particles >21µm		ASTM D7647	>80	▲ **127**	5	▲ 60
Particles >38µm		ASTM D7647	>20	**9**	0	4
Particles >71µm		ASTM D7647	>4	**0**	0	0
Oil Cleanliness		ISO 4406 (c)	>19/17/15	⬢ **25/21/16**	⬢ 23/19/12	▲ 23/19/15

OIL ANALYSIS REPORT

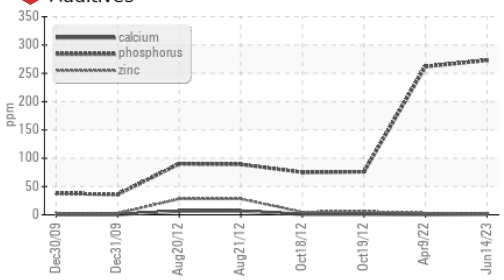
Particle Count



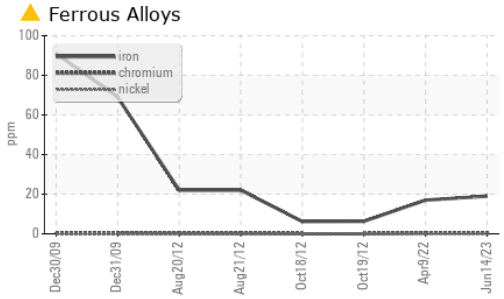
Particle Trend



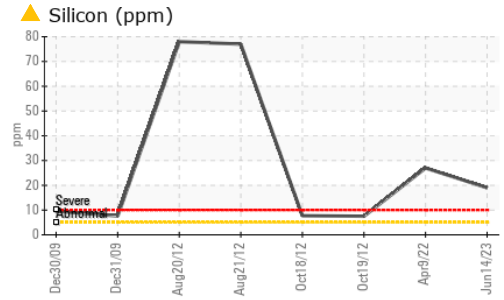
Additives



Ferrous Alloys



Silicon (ppm)

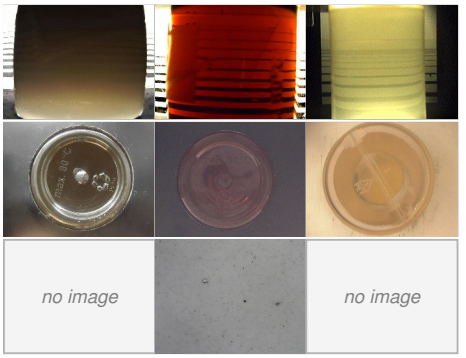


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*		**0.60**	0.52	0.20

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	**VLITE**	NONE	VLITE
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	**NONE**	NONE	NONE
Appearance	scalar	Visual*	NORML	**NORML**	NORML	NORML
Odor	scalar	Visual*	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	Visual*	>0.005	**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)	65.3	**66.5**	67.3	66.0

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					
PrtFilter			no image		no image



ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0744565
Lab Number : 02565313
Unique Number : 5594354
Test Package : IND 2 (Additional Tests: A-FERR, BottomAnalysis, DR-FERR, FILTERPATCH, PQ, TAN Man)

Received : 20 Jun 2023
Diagnosed : 22 Jun 2023
Diagnostician : Kevin Marson

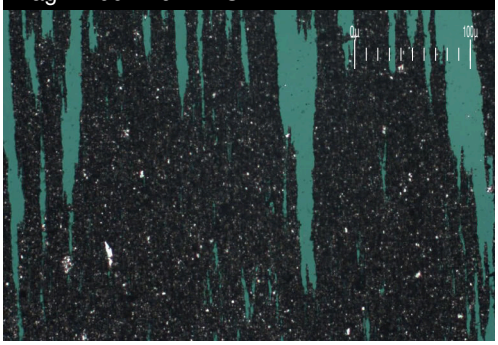
To discuss this sample report, contact Customer Service at 1-800-268-2131.
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
Validity of results and interpretation are based on the sample and information as supplied.

Bruce Power - Bruce A PdM
P.O.Box 1540, 177 Tie Road,, RM-222 U2 Column 2N11 615`
Tiverton, ON
CA N0G 2T0
Contact: Pierre Adouki
pierre.adouki@brucepower.com
T: (519)361-2673
F:

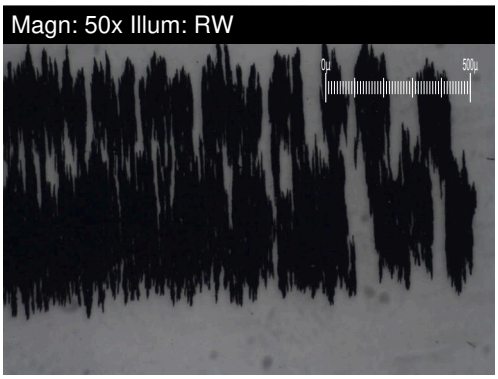
FERROGRAPHY REPORT

Area
(ZONE3) BRUCE B/0B/75120
Machine Id
0B-75120-CP4-Lube Oil Level
Component
Bulk Fluid Tank
Fluid
MOBIL SHC RARUS 68 (--- GAL)

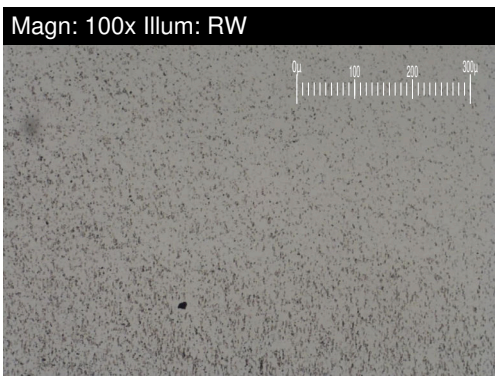
Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW

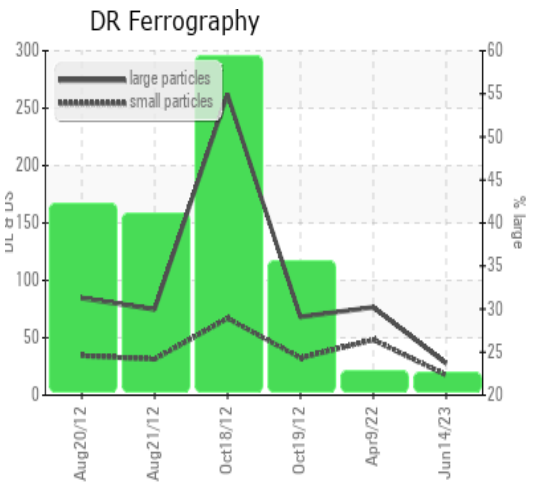


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**27.7**	76.6	68.2
Small Particles		DR-Ferr*		**17.5**	48.3	32.4
Total Particles		DR-Ferr*	>---	**45.2**	124.9	100.6
Large Particles Percentage	%	DR-Ferr*		**22.6**	22.7	35.6
Severity Index		DR-Ferr*		**283**	2168	2442

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		▲ **7**	4	3
Ferrous Sliding	Scale 0-10	ASTM D7684*				1
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		**4**	2	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*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*		**2**	1	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*				1
Sand/Dirt	Scale 0-10	ASTM D7684*		**1**	1	3
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**2**	2	

WEAR

Iron ppm levels are abnormal. Wear particle analysis indicates that the ferrous rubbing particles are abnormal. The diagnosis reflects updated information on this component.



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