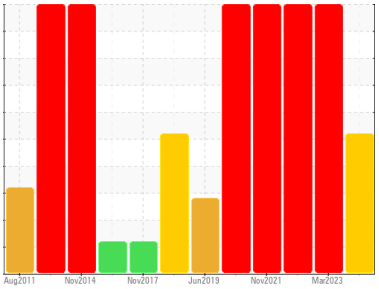
PROBLEM SUMMARY

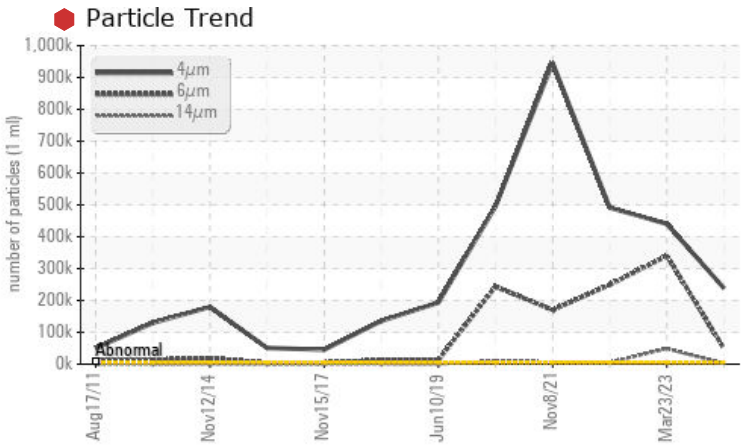
Area
(ZONE3) BRUCE A/4/34710
Machine Id
4-34710-P1-P OB Ball/Sleeve
Component
Outboard Bearing
Fluid
MOBIL DTE 732 (--- GAL)

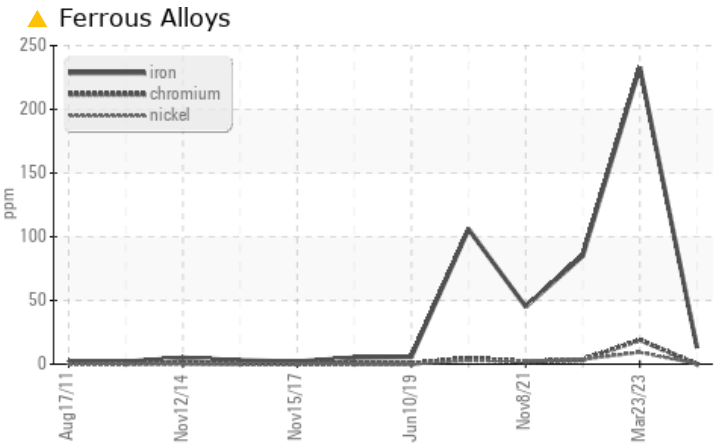
Sample Rating Trend



ISO

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. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	SEVERE	SEVERE
Iron	ppm	ASTM D5185(m)	>10	▲ **13**	⬢ 233	⬢ 85
Particles >4µm		ASTM D7647	>5000	⬢ **238331**	⬢ 440266	⬢ 491361
Particles >6µm		ASTM D7647	>1300	⬢ **48676**	⬢ 339768	⬢ 249413
Particles >14µm		ASTM D7647	>320	▲ **1390**	⬢ 48997	⬢ 5427
Particles >21µm		ASTM D7647	>80	▲ **187**	⬢ 7641	▲ 523
Oil Cleanliness		ISO 4406 (c)	>19/17/15	⬢ **25/23/18**	⬢ 26/26/23	⬢ 26/25/20

Customer Id: BRUTIV
Sample No.: WC0815683
Lab Number: 02603829
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
Change Filter	MISSED	Dec 20 2023	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.
Resample	MISSED	Dec 20 2023	?	Resample in 30-45 days to monitor this situation.
Information Required	MISSED	Dec 20 2023	?	NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.
Check Breathers	MISSED	Dec 20 2023	?	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	Dec 20 2023	?	We advise that you check all areas where contaminants can enter the system.
Filter Fluid	MISSED	Dec 20 2023	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.

HISTORICAL DIAGNOSIS

VISUAL METAL

23 Mar 2023 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We advise that you check for visible metal particles in the oil. Wear particles and/or ppm levels are abnormally high indicating the need to review OEM limits with attention to components that may generate this type of wear. Include all test results and maintenance activities that have been performed since the abnormal condition was first detected in this review. We recommend that you drain the oil from the component if this has not already been done. 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. An inspection for the source(s) of wear may be warranted at this time. Resample in 30-45 days to monitor this situation. Re-sampling is suggested to confirm test results prior to significant maintenance activities being performed. Please indicate that this is a resample on your Sample Information Form (SIF). NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Chromium and iron ppm levels are severe. Copper and nickel ppm levels are abnormal. Wear particle analysis indicates that the ferrous rubbing particles are abnormal. Wear particle analysis indicates that the ferrous corrosive particles are marginal. Moderate concentration of visible metal present. Bearing wear is indicated. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. 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 no longer serviceable as a result of the abnormal and/or severe wear.

view report

WEAR

16 Jun 2022 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We recommend either performing an oil change or oil filtration. We cannot recommend specific action as we have limited information with regards to reservoir capacity and/or lubricant type. 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. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Iron ppm levels are severe. Wear particle analysis indicates that the ferrous rubbing and ferrous corrosive particles are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. Particles >14µm are severely high. Particles >6µm are severely high. Oil Cleanliness are severely high. Particles >4µm are severely high. Particles >21µm are abnormally high. 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 no longer serviceable as a result of the abnormal and/or severe wear. NOTE: The color of the oil is darker then previous samples.

view report

WEAR

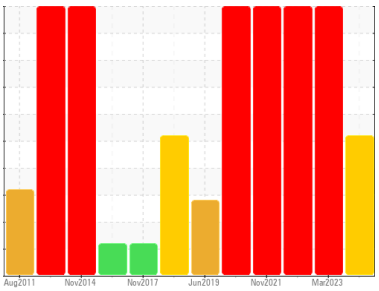
08 Nov 2021 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. 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. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Iron ppm levels are severe. Wear particle analysis indicates that the ferrous rolling particles are abnormal. Large Particles, severity index and total particles levels are abnormal. Wear particle analysis indicates that the ferrous corrosive and ferrous rubbing particles are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. Particles >14µm are severely high. Particles >21µm are severely high. Particles >6µm are severely high. Particles >4µm are severely high. Particles >38µm are abnormally high. Particles >71µm are abnormally high. 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 no longer serviceable as a result of the abnormal and/or severe wear.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Area
(ZONE3) BRUCE A/4/34710
Machine Id
4-34710-P1-P OB Ball/Sleeve
Component
Outboard Bearing
Fluid
MOBIL DTE 732 (--- GAL)

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. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

Wear

Iron ppm levels are abnormal. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion.

Contamination

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.

Fluid Condition

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		**WC0815683**	WC	WC0696836
Sample Date		Client Info		**27 Sep 2023**	23 Mar 2023	16 Jun 2022
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

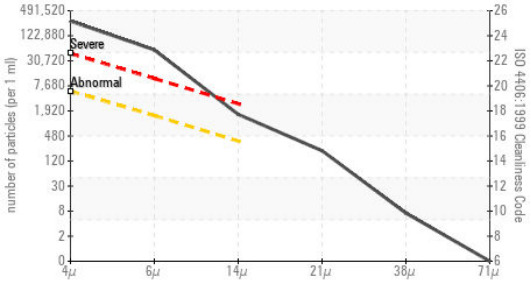
WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**1**	55	31
Iron	ppm	ASTM D5185(m)	>10	▲ **13**	⬢ 233	⬢ 85
Chromium	ppm	ASTM D5185(m)	>5	**0**	⬢ 19	3
Nickel	ppm	ASTM D5185(m)	>5	**<1**	▲ 9	4
Titanium	ppm	ASTM D5185(m)	>5	**0**	<1	0
Silver	ppm	ASTM D5185(m)		**<1**	0	0
Aluminum	ppm	ASTM D5185(m)	>5	**<1**	2	<1
Lead	ppm	ASTM D5185(m)	>5	**1**	1	<1
Copper	ppm	ASTM D5185(m)	>5	**<1**	▲ 9	<1
Tin	ppm	ASTM D5185(m)	>5	**0**	<1	0
Antimony	ppm	ASTM D5185(m)		**0**	<1	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

DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**107.2**	98.2	6.8
Small Particles		DR-Ferr*		**51.3**	55.6	5.3
Total Particles		DR-Ferr*	>---	**158.5**	153.8	12.1
Large Particles Percentage	%	DR-Ferr*		**35.3**	27.7	12.4
Severity Index		DR-Ferr*		**5992**	4183	10

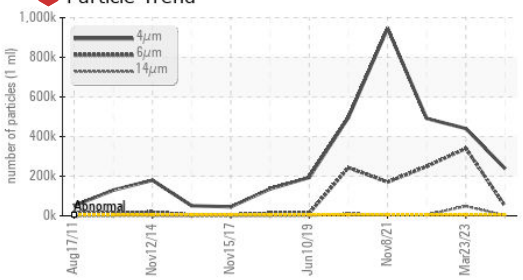
FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*			▲ 8	▲ 7
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*			3	3
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 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*			▲ 3	▲ 5
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	▲ 4
Sand/Dirt	Scale 0-10	ASTM D7684*			1	2
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*			2	2

OIL ANALYSIS REPORT

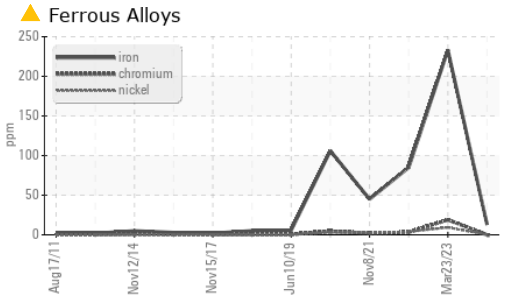
Particle Count



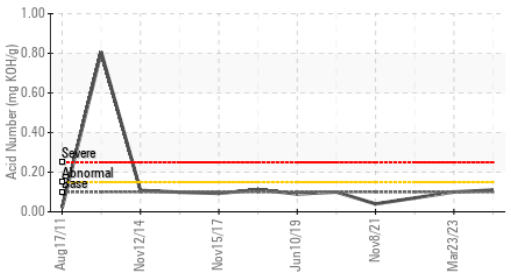
Particle Trend



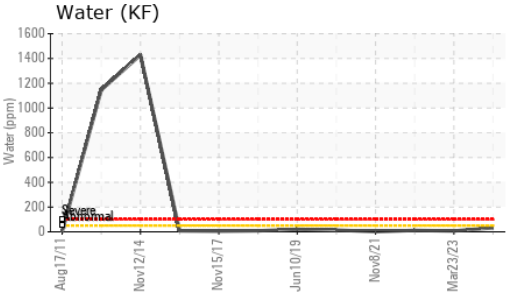
Ferrous Alloys



Acid Number



Water (KF)



ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**<1**	<1	0
Barium	ppm	ASTM D5185(m)		**<1**	0	0
Molybdenum	ppm	ASTM D5185(m)		**0**	0	0
Manganese	ppm	ASTM D5185(m)		**0**	1	<1
Magnesium	ppm	ASTM D5185(m)		**<1**	<1	<1
Calcium	ppm	ASTM D5185(m)		**1**	0	0
Phosphorus	ppm	ASTM D5185(m)		**<1**	0	<1
Zinc	ppm	ASTM D5185(m)		**<1**	<1	<1
Sulfur	ppm	ASTM D5185(m)		**17**	297	311
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>5	**<1**	3	<1
Sodium	ppm	ASTM D5185(m)	>5	**1**	<1	0
Potassium	ppm	ASTM D5185(m)	>20	**0**	0	0
Water	%	ASTM D6304*	>0.005	**0.003**	0.001	0.001
ppm Water	ppm	ASTM D6304*	>50	**32**	7.1	11.3

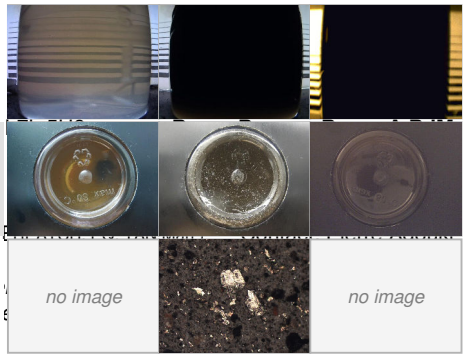
FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>5000	**238331**	440266	491361
Particles >6µm	ASTM D7647	>1300	**48676**	339768	249413
Particles >14µm	ASTM D7647	>320	**1390**	48997	5427
Particles >21µm	ASTM D7647	>80	**187**	7641	523
Particles >38µm	ASTM D7647	>20	**6**	125	22
Particles >71µm	ASTM D7647	>4	**0**	7	1
Oil Cleanliness	ISO 4406 (c)	>19/17/15	**25/23/18**	26/26/23	26/25/20

FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.10	**0.11**	0.10	0.07

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	**VLITE**	MODER	NONE
Yellow Metal	scalar	Visual*	NONE	**NONE**	NONE	NONE
Precipitate	scalar	Visual*	NONE	**NONE**	NONE	NONE
Silt	scalar	Visual*	NONE	**LIGHT**	NONE	VLITE
Debris	scalar	Visual*	NONE	**NONE**	VLITE	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)	30.0	**31.5**	30.5	30.9

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



CALA Testing Accreditation No. 1005078
ISO 17025:2017 Accredited Laboratory

Laboratory
Sample No.
Lab Number
Unique Number
Test Package

To discuss this sample report, cc
Test denoted (*) outside scope o
Validity of results and interpretati