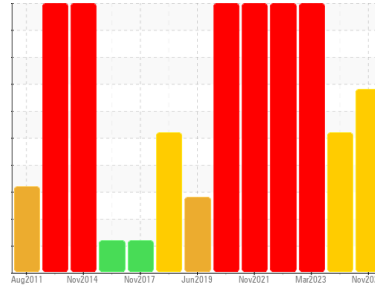




# PROBLEM SUMMARY

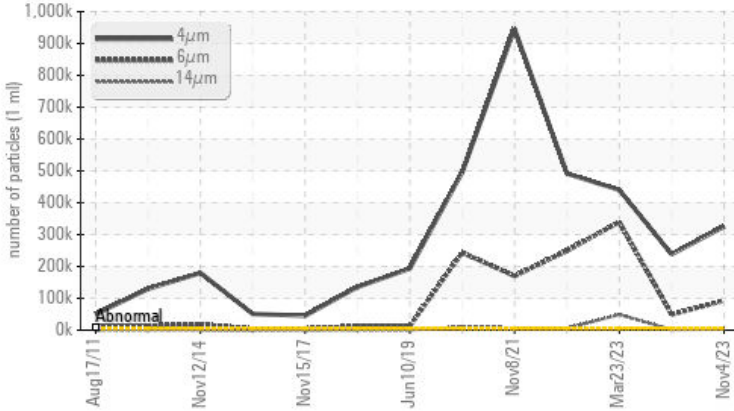
Area  
**(ZONE3) BRUCE A/4/34710**  
 Machine Id  
**4-34710-P1-P OB Ball/Sleeve**  
 Component  
**Outboard Bearing**  
 Fluid  
**MOBIL DTE 732 (--- GAL)**

Sample Rating Trend

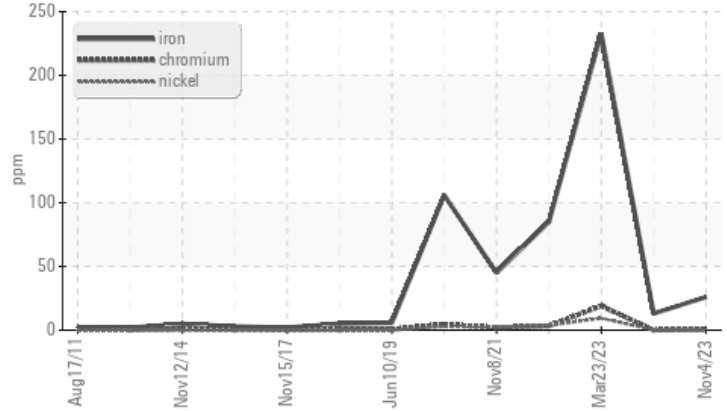


## COMPONENT CONDITION SUMMARY

Particle Trend



Ferrous Alloys



## 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	▲ 26	▲ 13	● 233
Particles >4µm		ASTM D7647 >5000	● 325265	● 238331	● 440266
Particles >6µm		ASTM D7647 >1300	● 92828	● 48676	● 339768
Particles >14µm		ASTM D7647 >320	● 2802	▲ 1390	● 48997
Particles >21µm		ASTM D7647 >80	▲ 566	▲ 187	● 7641
Oil Cleanliness		ISO 4406 (c) >19/17/15	● 26/24/19	● 25/23/18	● 26/26/23

Customer Id: BRUTIV  
 Sample No.: WC  
 Lab Number: 02603833  
 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](mailto:Kevin.Marson@wearcheck.com)

To change component or sample information:  
 Gloria Gonzalez +1 (289)291-4643 x4643  
[gloria.gonzalez@wearcheck.com](mailto: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.
Information Required	---	---	?	NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.
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



#### 27 Sep 2023 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. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. Iron ppm levels are abnormal. 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](#)



### 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 than previous samples.

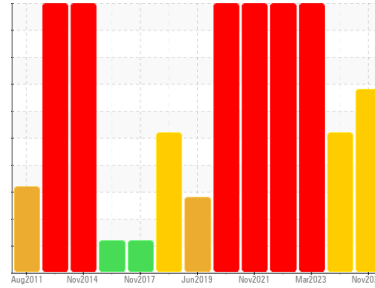
[view report](#)





# 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	<b>WC</b>	WC0815683	WC
Sample Date	Client Info	<b>04 Nov 2023</b>	27 Sep 2023	23 Mar 2023
Machine Age	hrs	<b>0</b>	0	0
Oil Age	hrs	<b>0</b>	0	0
Oil Changed	Client Info	<b>N/A</b>	N/A	N/A
Sample Status		<b>SEVERE</b>	SEVERE	SEVERE

## WEAR METALS

method	limit/base	current	history1	history2	
PQ	ASTM D8184*	<b>10</b>	1	55	
Iron	ppm	ASTM D5185(m) >10	<b>▲ 26</b>	▲ 13	● 233
Chromium	ppm	ASTM D5185(m) >5	<b>&lt;1</b>	0	● 19
Nickel	ppm	ASTM D5185(m) >5	<b>&lt;1</b>	<1	▲ 9
Titanium	ppm	ASTM D5185(m) >5	<b>0</b>	0	<1
Silver	ppm	ASTM D5185(m)	<b>&lt;1</b>	<1	0
Aluminum	ppm	ASTM D5185(m) >5	<b>&lt;1</b>	<1	2
Lead	ppm	ASTM D5185(m) >5	<b>1</b>	1	1
Copper	ppm	ASTM D5185(m) >5	<b>&lt;1</b>	<1	▲ 9
Tin	ppm	ASTM D5185(m) >5	<b>0</b>	0	<1
Antimony	ppm	ASTM D5185(m)	<b>0</b>	0	<1
Vanadium	ppm	ASTM D5185(m)	<b>0</b>	0	0
Beryllium	ppm	ASTM D5185(m)	<b>0</b>	0	0
Cadmium	ppm	ASTM D5185(m)	<b>0</b>	0	0

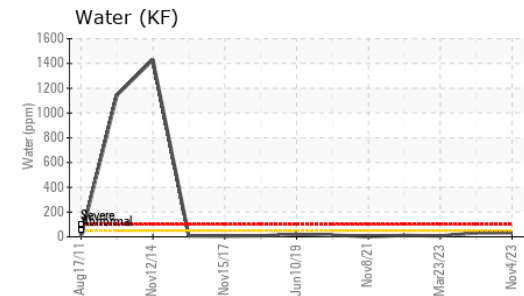
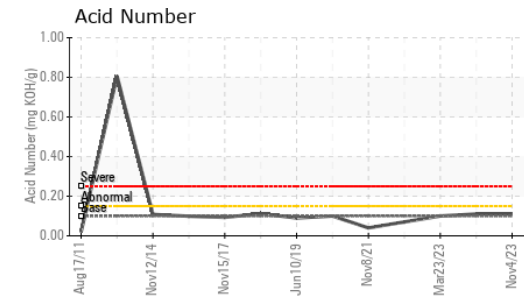
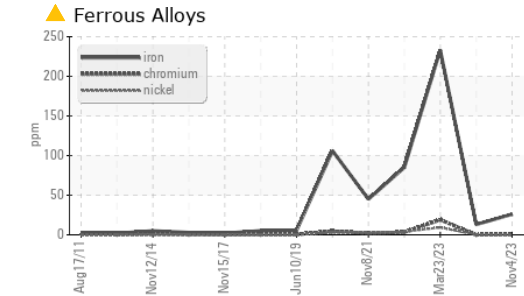
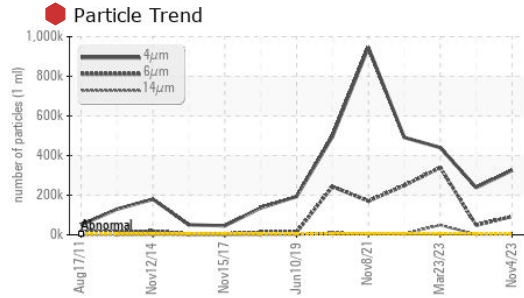
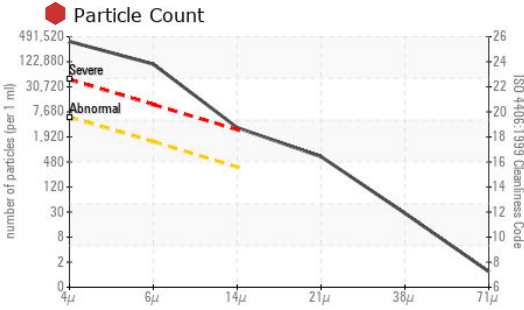
## DR-FERROGRAPHY

method	limit/base	current	history1	history2
Large Particles	DR-Ferr*	<b>176.0</b>	107.2	98.2
Small Particles	DR-Ferr*	<b>139.4</b>	51.3	55.6
Total Particles	DR-Ferr*	<b>315.4</b>	158.5	153.8
Large Particles Percentage	%	<b>11.6</b>	35.3	27.7
Severity Index	DR-Ferr*	<b>6442</b>	5992	4183

## FERROGRAPHY

method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		▲ 8
Ferrous Sliding	Scale 0-10	ASTM D7684*		
Ferrous Cutting	Scale 0-10	ASTM D7684*		
Ferrous Rolling	Scale 0-10	ASTM D7684*		■ 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
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
Fibres	Scale 0-10	ASTM D7684*		
Spheres	Scale 0-10	ASTM D7684*		
Other	Scale 0-10	ASTM D7684*		

# OIL ANALYSIS REPORT



ADDITIVES	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	<1	<1	<1
Barium	ppm	ASTM D5185(m)	<1	<1	0
Molybdenum	ppm	ASTM D5185(m)	0	0	0
Manganese	ppm	ASTM D5185(m)	0	0	1
Magnesium	ppm	ASTM D5185(m)	<1	<1	<1
Calcium	ppm	ASTM D5185(m)	<1	1	0
Phosphorus	ppm	ASTM D5185(m)	<1	<1	0
Zinc	ppm	ASTM D5185(m)	<1	<1	<1
Sulfur	ppm	ASTM D5185(m)	18	17	297
Lithium	ppm	ASTM D5185(m)	<1	<1	<1

CONTAMINANTS	method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185(m)	>5	<1	<1	3
Sodium	ppm	ASTM D5185(m)	>5	2	1	<1
Potassium	ppm	ASTM D5185(m)	>20	0	0	0
Water	%	ASTM D6304*	>0.005	0.003	0.003	0.001
ppm Water	ppm	ASTM D6304*	>50	33	32	7.1

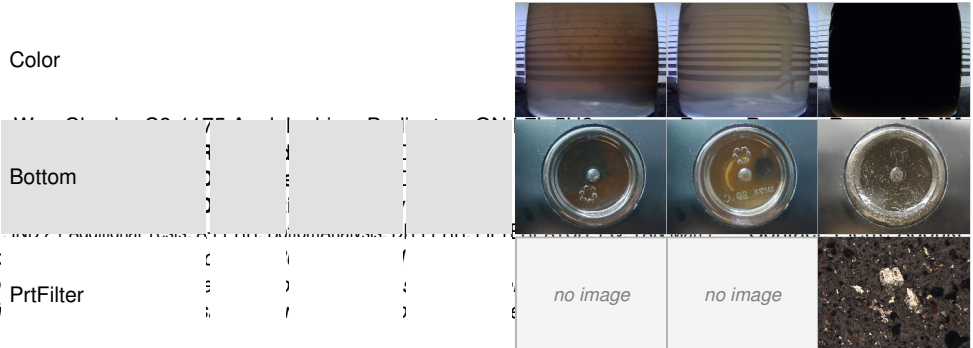
FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>5000	325265	238331	440266
Particles >6µm	ASTM D7647	>1300	92828	48676	339768
Particles >14µm	ASTM D7647	>320	2802	1390	48997
Particles >21µm	ASTM D7647	>80	566	187	7641
Particles >38µm	ASTM D7647	>20	25	6	125
Particles >71µm	ASTM D7647	>4	1	0	7
Oil Cleanliness	ISO 4406 (c)	>19/17/15	26/24/19	25/23/18	26/26/23

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

VISUAL	method	limit/base	current	history1	history2	
White Metal	scalar	Visual*	NONE	VLITE	VLITE	MODER
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Precipitate	scalar	Visual*	NONE	NONE	NONE	NONE
Silt	scalar	Visual*	NONE	LIGHT	LIGHT	NONE
Debris	scalar	Visual*	NONE	NONE	NONE	VLITE
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	33.2	31.5	30.5

SAMPLE IMAGES	method	limit/base	current	history1	history2
---------------	--------	------------	---------	----------	----------



**Laboratory Sample No.**  
**Lab Number**  
**Unique Number**  
**Test Package**

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

PrtFilter