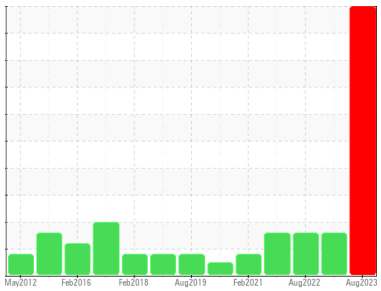
PROBLEM SUMMARY

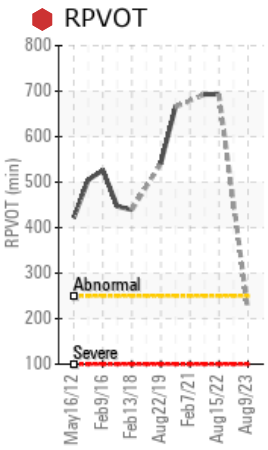
Sample Rating Trend

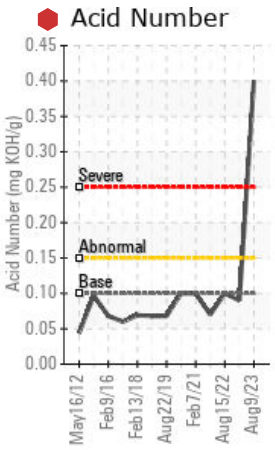


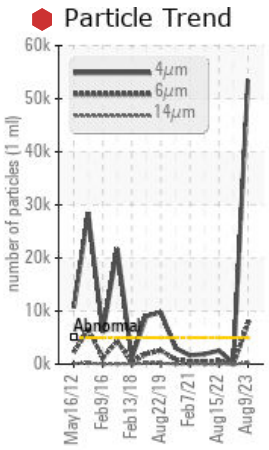
DEGRADATION

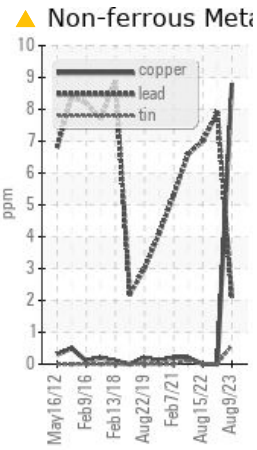
Area
(ZONE3) BRUCE B/7/33310
Machine Id
7-33310-P1-Tank
Component
Bulk Fluid Tank
Fluid
MOBIL DTE 732 (--- GAL)

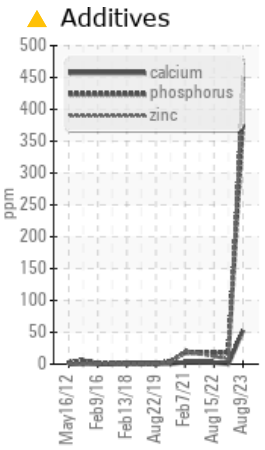
COMPONENT CONDITION SUMMARY











RECOMMENDATION

Check seals and/or filters for points of contaminant entry. The oil is near the end of it`s useful service life, recommend schedule an oil change. 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 MOBIL DTE 732, however, a fluid match indicates that this fluid is ISO 32 AW Hydraulic Oil. Please confirm the oil type and grade on your next sample.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	ABNORMAL	ABNORMAL
Copper	ppm	ASTM D5185(m)	>5	▲ **9**	0	0
Calcium	ppm	ASTM D5185(m)		▲ **53**	<1	2
Phosphorus	ppm	ASTM D5185(m)		▲ **379**	▲ 18	▲ 17
Zinc	ppm	ASTM D5185(m)		▲ **447**	▲ 8	▲ 12
Particles >4µm		ASTM D7647	>5000	● **53498**	215	2550
Particles >6µm		ASTM D7647	>1300	▲ **7683**	52	615
Oil Cleanliness		ISO 4406 (c)	>19/17/15	● **23/20/15**	15/13/10	19/16/12
Acid Number (AN)	mg KOH/g	ASTM D974*	0.10	● **0.40**	0.09	0.10
Oxidation Test (RPVOT)	minutes	ASTM D2272*	1000	● **218**	---	693

Customer Id: BRUTIV
Sample No.: WC0744567
Lab Number: 02577197
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	---	---	?	Resample in 30-45 days to monitor this situation.
Alert	---	---	?	The fluid was specified as MOBIL DTE 732, however, a fluid match indicates that this fluid is ISO 32 AW Hydraulic Oil. Please confirm the oil type and grade on your 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 Fluid Source	---	---	?	Confirm the source of the lubricant being utilized for top-up/fill.
Check Seals	---	---	?	Check seals and/or filters for points of contaminant entry.

HISTORICAL DIAGNOSIS

WEAR

13 Feb 2023 Diag: Kevin Marson

Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. The fluid was specified as MOBIL DTE 732, however, a fluid match indicates that this fluid is ISO 32 R&O Hydraulic Oil. Please confirm the oil type and grade on your next sample. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Lead ppm levels are abnormal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Additive levels indicate the addition of a different brand, or type of oil. 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

15 Aug 2022 Diag: Kevin Marson

Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. The fluid was specified as MOBIL DTE 732, however, a fluid match indicates that this fluid is ISO 32 R&O Hydraulic Oil. Please confirm the oil type and grade on your next sample. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Lead ppm levels are abnormal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Additive levels indicate the addition of a different brand, or type of oil. The Rotating Pressure Vessel Oxidation Test (RPVOT – ASTM D2272) result indicates suitable amounts of anti-oxidant(s) present in the oil. The AN level is acceptable for this fluid.

view report

WEAR

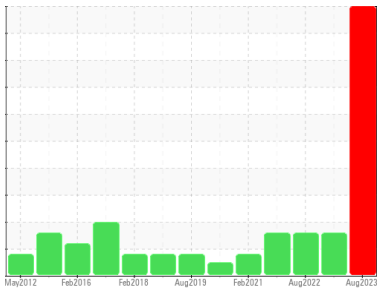
06 Aug 2021 Diag: Kevin Marson

Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. The fluid was specified as MOBIL DTE 732, however, a fluid match indicates that this fluid is ISO 32 R&O Hydraulic Oil. Please confirm the oil type and grade on your next sample. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.Lead ppm levels are abnormal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. Additive levels indicate the addition of a different brand, or type of oil. The Rotating Pressure Vessel Oxidation Test (RPVOT – ASTM D2272) result indicates suitable amounts of anti-oxidant(s) present in the oil. The AN level is acceptable for this fluid.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



DEGRADATION

Area
(ZONE3) BRUCE B/7/33310
Machine Id
7-33310-P1-Tank
Component
Bulk Fluid Tank
Fluid
MOBIL DTE 732 (--- GAL)

DIAGNOSIS

Recommendation

Check seals and/or filters for points of contaminant entry. The oil is near the end of it`s useful service life, recommend schedule an oil change. 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 MOBIL DTE 732, however, a fluid match indicates that this fluid is ISO 32 AW Hydraulic Oil. Please confirm the oil type and grade on your next sample.

Wear

Copper ppm levels are abnormal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system.

Contaminants

There is a high amount of silt (particulates < 14 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.

Oil Condition

Additive levels indicate the addition of a different brand, or type of oil. The high AN level of the oil indicates the presence of oxi-polymerized products. The relatively low Rotating Pressure Vessel Oxidation Test (RPVOT – ASTM D2272) result indicates less than 25% of the remaining anti-oxidant(s) present in the oil. 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.

SAMPLE INFORMATION	method	limit/base	current	history1	history2
Sample Number	Client Info		**WC0744567**	WC	WC0711437
Sample Date	Client Info		**09 Aug 2023**	13 Feb 2023	15 Aug 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**	ABNORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>10	**0**	0	0
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	**0**	<1	<1
Lead	ppm	ASTM D5185(m)	>5	**2**	▲ 8	▲ 7
Copper	ppm	ASTM D5185(m)	>5	▲ **9**	0	0
Tin	ppm	ASTM D5185(m)	>5	**<1**	0	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

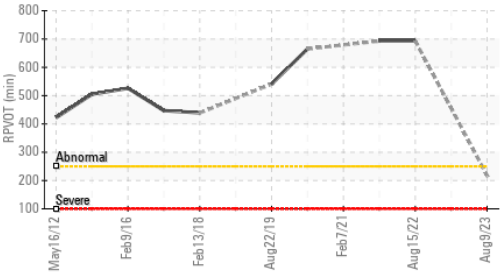
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**0**	<1	<1
Barium	ppm	ASTM D5185(m)		**0**	0	0
Molybdenum	ppm	ASTM D5185(m)		**0**	0	0
Manganese	ppm	ASTM D5185(m)		**0**	0	0
Magnesium	ppm	ASTM D5185(m)		**<1**	0	0
Calcium	ppm	ASTM D5185(m)		▲ **53**	<1	2
Phosphorus	ppm	ASTM D5185(m)		▲ **379**	▲ 18	▲ 17
Zinc	ppm	ASTM D5185(m)		▲ **447**	▲ 8	▲ 12
Sulfur	ppm	ASTM D5185(m)		**4472**	1240	1282
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	**<1**	0	0
Potassium	ppm	ASTM D5185(m)	>20	**<1**	<1	<1
Water	%	ASTM D6304*	>0.005	**0.001**	0.00	0.002
ppm Water	ppm	ASTM D6304*	>50	**9.0**	0.00	20.6

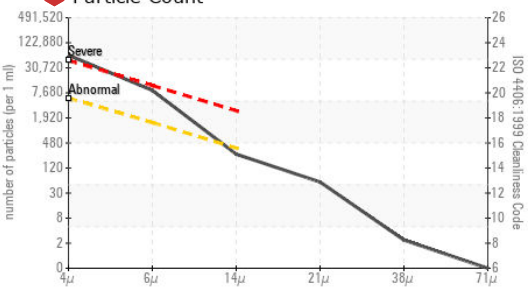
FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>5000	● **53498**	215	2550
Particles >6µm	ASTM D7647	>1300	▲ **7683**	52	615
Particles >14µm	ASTM D7647	>320	**228**	6	31
Particles >21µm	ASTM D7647	>80	**49**	1	7
Particles >38µm	ASTM D7647	>20	**2**	0	0
Particles >71µm	ASTM D7647	>4	**0**	0	0
Oil Cleanliness	ISO 4406 (c)	>19/17/15	● **23/20/15**	15/13/10	19/16/12

OIL ANALYSIS REPORT

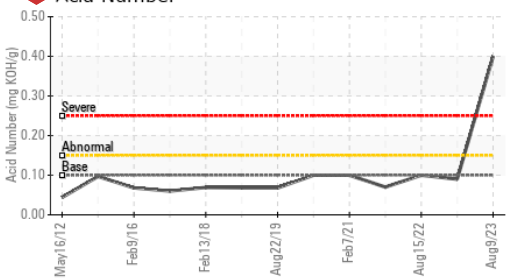
RPVOT



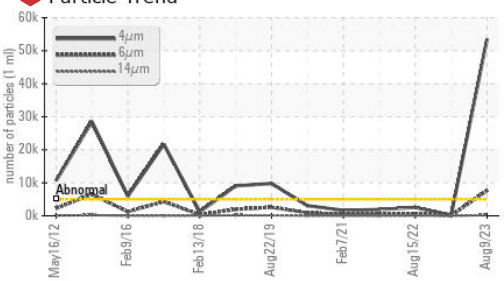
Particle Count



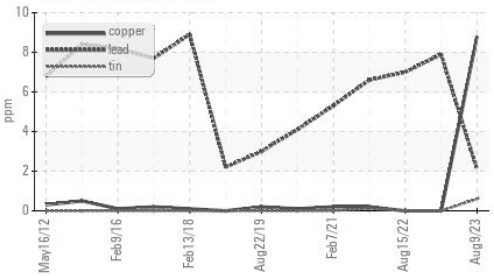
Acid Number



Particle Trend



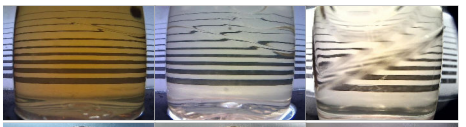
Non-ferrous Metals



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.10	**0.40**	0.09	0.10

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	**VLITE**	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)	30.0	**33.8**	31.8	32.0
Oxidation Test (RPVOT)	minutes	ASTM D2272*	1000	**218**	---	693

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

ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0744567 **Received** : 21 Aug 2023
Lab Number : 02577197 **Diagnosed** : 30 Aug 2023
Unique Number : 5630257 **Diagnostician** : Kevin Marson
Test Package : IND 2 (Additional Tests: A-FERR, DR-FERR, FILTERPATCH, RPVOT, TAN Man)

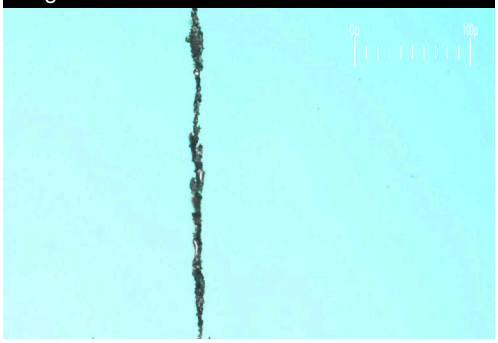
To discuss this sample report, contact Customer Service at 1-800-268-2131.
Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
Validity of results and interpretation are based on the sample and information as supplied.

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:

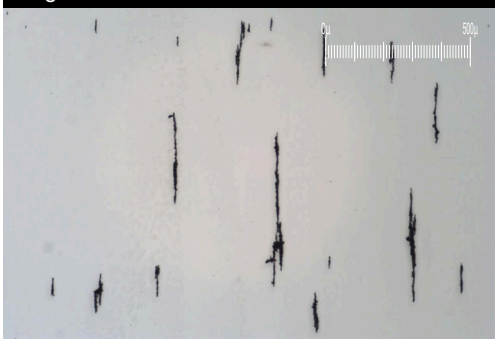
FERROGRAPHY REPORT

Area
(ZONE3) BRUCE B/7/33310
Machine Id
7-33310-P1-Tank
Component
Bulk Fluid Tank
Fluid
MOBIL DTE 732 (--- GAL)

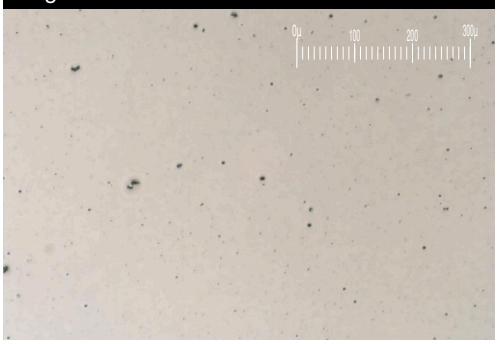
Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW

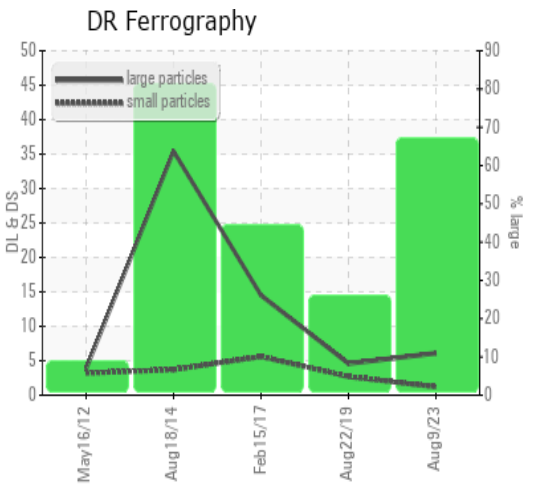


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		**6.1**	---	---
Small Particles		DR-Ferr*		**1.2**	---	---
Total Particles		DR-Ferr*	>---	**7.3**	---	---
Large Particles Percentage	%	DR-Ferr*		**67.1**	---	---
Severity Index		DR-Ferr*		**30**	---	---

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		**2**		
Ferrous Sliding	Scale 0-10	ASTM D7684*		**1**		
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*				
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**		
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		**2**		

WEAR

Copper ppm levels are abnormal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system.



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