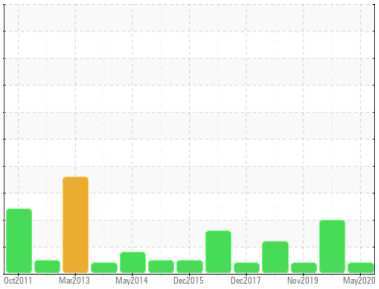
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

PROBLEM SUMMARY

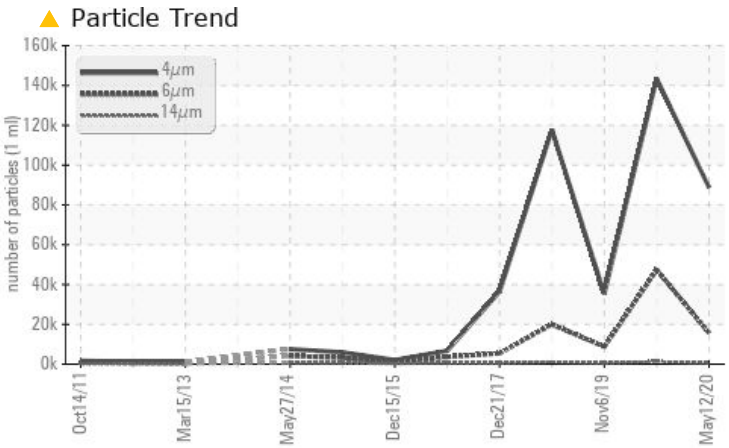
Area
SWEETWATER
Machine Id
D092
Component
Wind Turbine Gearbox
Fluid
MITSUBISHI Daphne Alpha Winforce (60 GAL)

Sample Rating Trend



ISO

COMPONENT CONDITION SUMMARY



RECOMMENDATION

Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil.

PROBLEMATIC TEST RESULTS

Sample Status				**ABNORMAL**	ABNORMAL	ABNORMAL
Particles >6µm		ASTM D7647	>5000	▲ **15701**	▲ 47353	▲ 8774
Oil Cleanliness		ISO 4406 (c)	>--/19/16	▲ **24/21/16**	▲ 24/23/17	▲ 22/20/16

Customer Id: MITROS
Sample No.: MHI018342
Lab Number: 04984694
Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Don Baldridge +1
don.b505@comcast.net

To change component or sample information:
Customer Service +1 1-800-237-1369
customerservice@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Change Filter	---	---	?	Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil.
Resample	---	---	?	Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil.

HISTORICAL DIAGNOSIS

23 Mar 2020 Diag: Don Baldridge

ISO

Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil.All component wear rates are normal. There is a high amount of particulates present in the oil. The AN level is acceptable for this fluid.

view report

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06 Nov 2019 Diag: Don Baldridge

ISO

Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil.All component wear rates are normal. There is a high amount of silt (particulates < 14 microns in size) present in the oil. The AN level is acceptable for this fluid.

view report

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01 Oct 2018 Diag: Don Baldridge

ISO

Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s).All component wear rates are normal. There is a high amount of particulates present in the oil. The AN level is acceptable for this fluid.

view report

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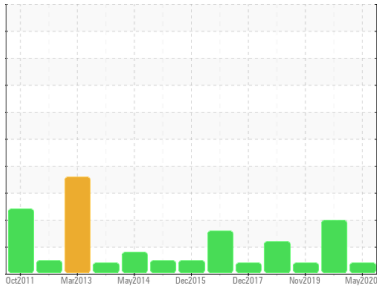
OIL ANALYSIS REPORT

Area
SWEETWATER
Machine Id
D092
Component
Wind Turbine Gearbox
Fluid
MITSUBISHI Daphne Alpha Winforce (60 GAL)

Sample Rating Trend



ISO

DIAGNOSIS

Recommendation
Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil.

Wear
All component wear rates are normal.

Contamination
There is a high amount of silt (particulates < 14 microns in size) present in the oil.

Fluid Condition
The AN level is acceptable for this fluid.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**MHI018342**	MHI018358	MHI188252
Sample Date		Client Info		**12 May 2020**	23 Mar 2020	06 Nov 2019
Machine Age	hrs	Client Info		**0**	0	32130
Oil Age	hrs	Client Info		**36206**	35096	0
Oil Changed		Client Info		**N/A**	N/A	N/A
Sample Status				**ABNORMAL**	ABNORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>200	**28**	47	13
Iron	ppm	ASTM D5185m	>200	**37**	42	24
Chromium	ppm	ASTM D5185m		**<1**	<1	<1
Nickel	ppm	ASTM D5185m		**0**	<1	2
Titanium	ppm	ASTM D5185m		**0**	0	0
Silver	ppm	ASTM D5185m		**0**	0	0
Aluminum	ppm	ASTM D5185m		**0**	<1	<1
Lead	ppm	ASTM D5185m		**0**	0	<1
Copper	ppm	ASTM D5185m	>75	**8**	7	8
Tin	ppm	ASTM D5185m		**<1**	<1	0
Antimony	ppm	ASTM D5185m		**0**	0	0
Vanadium	ppm	ASTM D5185m		**0**	0	0
Cadmium	ppm	ASTM D5185m		**0**	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m		**<1**	<1	<1
Barium	ppm	ASTM D5185m		**0**	0	0
Molybdenum	ppm	ASTM D5185m		**4**	4	3
Manganese	ppm	ASTM D5185m		**<1**	<1	<1
Magnesium	ppm	ASTM D5185m		**<1**	<1	0
Calcium	ppm	ASTM D5185m		**1**	1	<1
Phosphorus	ppm	ASTM D5185m		**374**	389	307
Zinc	ppm	ASTM D5185m		**0**	0	38
Sulfur	ppm	ASTM D5185m		**4863**	5253	3987

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+30	**3**	5	3
Sodium	ppm	ASTM D5185m		**0**	0	<1
Potassium	ppm	ASTM D5185m	>20	**0**	<1	6
Water	%	ASTM D6304	>0.1	**0.009**	0.010	0.012
ppm Water	ppm	ASTM D6304	>1000	**94.7**	106.0	127.5

FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**88747**	143419	35455
Particles >6µm		ASTM D7647	>5000	▲ **15701**	▲ 47353	▲ 8774
Particles >14µm		ASTM D7647	>640	**424**	▲ 1255	538
Particles >21µm		ASTM D7647	>160	**66**	▲ 149	130
Particles >38µm		ASTM D7647	>40	**8**	▲ 10	12
Particles >71µm		ASTM D7647	>10	**5**	▲ 7	0
Oil Cleanliness		ISO 4406 (c)	>--/19/16	▲ **24/21/16**	▲ 24/23/17	▲ 22/20/16

OIL ANALYSIS REPORT

DIAMOND WTG ENGINEERING & SERVICES, INC.
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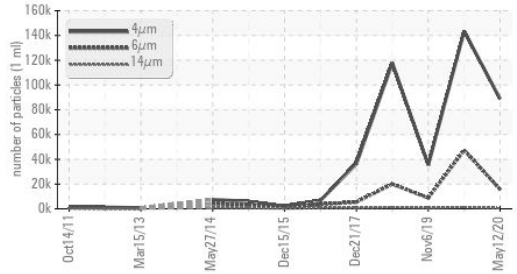
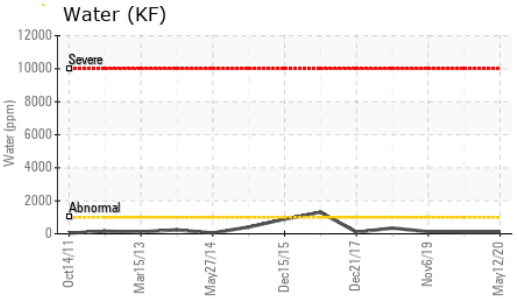
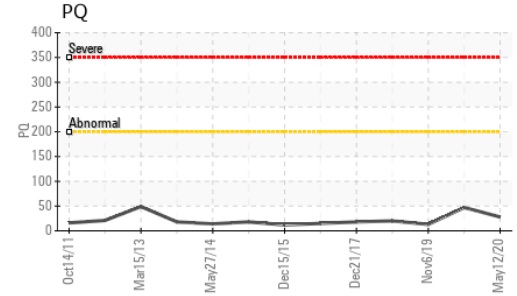
Particle Trend



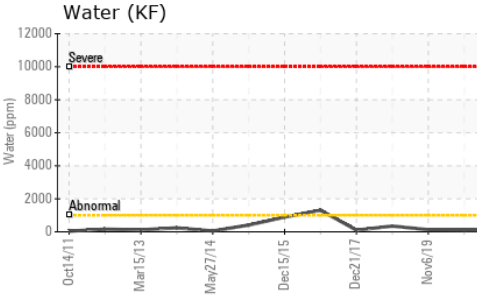
Water (KF)



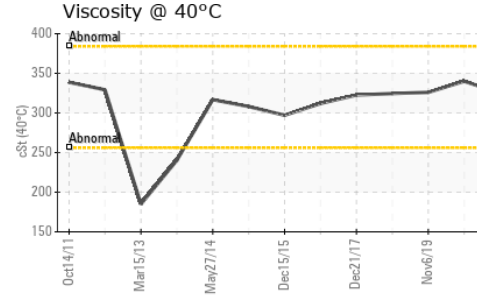
PQ



Water (KF)



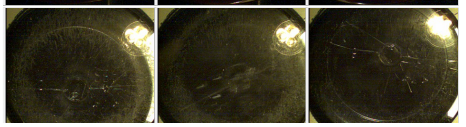
Viscosity @ 40°C



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045		**1.117**	1.137	1.247

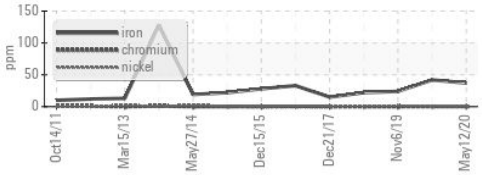
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**MODER**	MODER	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	LIGHT	NONE
Sand/Dirt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Appearance	scalar	*Visual	NORML	**NORML**	NORML	NORML
Odor	scalar	*Visual	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	**NEG**	NEG	NEG
Free Water	scalar	*Visual		**NEG**	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445		**325**	340	326

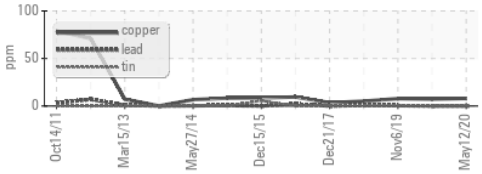
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

GRAPHS

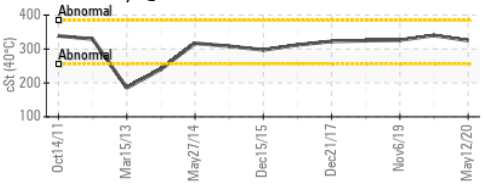
Ferrous Alloys



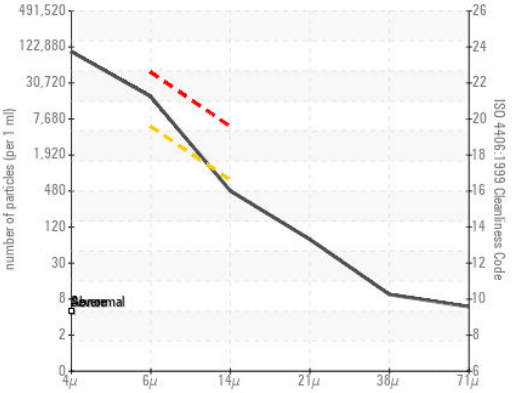
Non-ferrous Metals



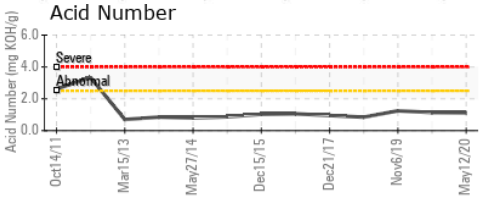
Viscosity @ 40°C



Particle Count



Acid Number



Certificate L2367

Laboratory	: WearCheck USA - 501 Madison Ave., Cary, NC 27513		
Sample No.	: MHI018342	**Received**	: 26 May 2020
Lab Number	: 04984694	**Diagnosed**	: 28 May 2020
Unique Number	: 9039841	**Diagnostician**	: Don Baldridge
Test Package	: IND 2 (Additional Tests: KF, PQ, PrtCount)		

To discuss this sample report, contact Customer Service at 1-800-237-1369.
** - Denotes test methods that are outside of the ISO 17025 scope of accreditation.*
Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

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F: (325)288-4338