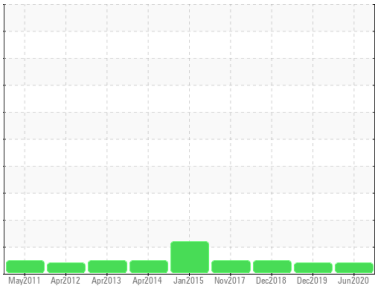
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

PROBLEM SUMMARY

Sample Rating Trend



VIS DEBRIS

Machine Id
A-48
Component
Wind Turbine Gearbox
Fluid
MITSUBISHI Daphne Alpha Winforce (--- LTR)

COMPONENT CONDITION SUMMARY

No relevant graphs to display

RECOMMENDATION

Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil. We were unable to perform a particle count due to a high concentration of particles present in this sample.

PROBLEMATIC TEST RESULTS

Sample Status				**ABNORMAL**	ABNORMAL	NORMAL
Debris	scalar	*Visual	NONE	▲ **MODER**	LIGHT	NONE

Customer Id: MITSANNM
Sample No.: MHI023579
Lab Number: 05000025
Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Doug Bogart +1 (800)237-1369 x4016
dougb@wearcheckusa.com

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.
Alert	---	---	?	We were unable to perform a particle count due to a high concentration of particles present in this sample.

HISTORICAL DIAGNOSIS

02 Dec 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. The condition of the oil is acceptable for the time in service.

view report

12 Dec 2018 Diag: Don Baldridge

NORMAL

Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

07 Nov 2017 Diag: Wes Davis

NORMAL

Resample at the next service interval to monitor. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

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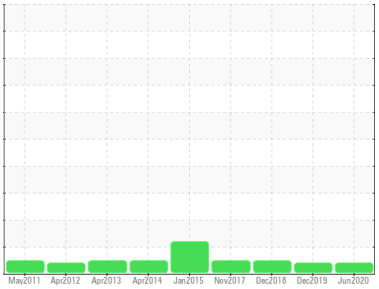
OIL ANALYSIS REPORT

Sample Rating Trend



VIS DEBRIS

Machine Id
A-48
Component
Wind Turbine Gearbox
Fluid
MITSUBISHI Daphne Alpha Winforce (--- LTR)

DIAGNOSIS

Recommendation
Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil. We were unable to perform a particle count due to a high concentration of particles present in this sample.

Wear
All component wear rates are normal.

Contamination
Moderate concentration of visible dirt/debris 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		**MHI023579**	MHI019006	MHI020397
Sample Date		Client Info		**01 Jun 2020**	02 Dec 2019	12 Dec 2018
Machine Age	hrs	Client Info		**0**	0	84910
Oil Age	hrs	Client Info		**95865**	92053	0
Oil Changed		Client Info		**Not Changd**	Not Changd	Not Changd
Sample Status				**ABNORMAL**	ABNORMAL	NORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>200	**17**	15	21
Iron	ppm	ASTM D5185m	>200	**32**	30	26
Chromium	ppm	ASTM D5185m		**<1**	<1	<1
Nickel	ppm	ASTM D5185m		**0**	<1	<1
Titanium	ppm	ASTM D5185m		**0**	0	0
Silver	ppm	ASTM D5185m		**<1**	0	0
Aluminum	ppm	ASTM D5185m		**<1**	0	0
Lead	ppm	ASTM D5185m		**0**	0	0
Copper	ppm	ASTM D5185m	>75	**10**	9	7
Tin	ppm	ASTM D5185m		**0**	<1	<1
Antimony	ppm	ASTM D5185m		**4**	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		**0**	<1	<1
Manganese	ppm	ASTM D5185m		**1**	<1	<1
Magnesium	ppm	ASTM D5185m		**<1**	<1	<1
Calcium	ppm	ASTM D5185m		**0**	0	0
Phosphorus	ppm	ASTM D5185m		**300**	329	357
Zinc	ppm	ASTM D5185m		**32**	19	23
Sulfur	ppm	ASTM D5185m		**3683**	4419	4044

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+30	**<1**	2	1
Sodium	ppm	ASTM D5185m		**<1**	<1	<1
Potassium	ppm	ASTM D5185m	>20	**<1**	<1	<1
Water	%	ASTM D6304	>0.1	**0.010**	0.006	0.007
ppm Water	ppm	ASTM D6304	>1000	**109.2**	68.2	70

FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		---	51878	807
Particles >6µm	ASTM D7647	>5000	---	▲ 8021	440
Particles >14µm	ASTM D7647	>640	---	620	74
Particles >21µm	ASTM D7647	>160	---	179	25
Particles >38µm	ASTM D7647	>40	---	8	3
Particles >71µm	ASTM D7647	>10	---	0	0
Oil Cleanliness	ISO 4406 (c)	>--/19/16	---	▲ 23/20/16	17/16/13

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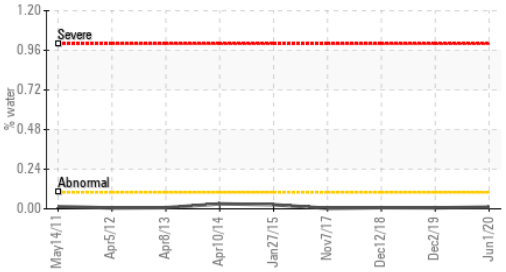
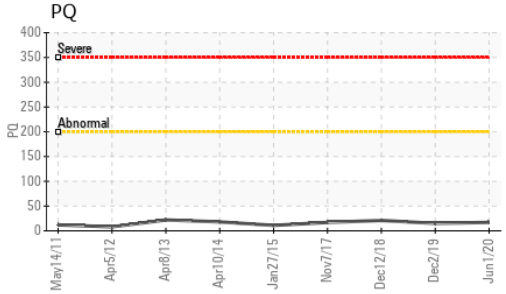
OIL ANALYSIS REPORT

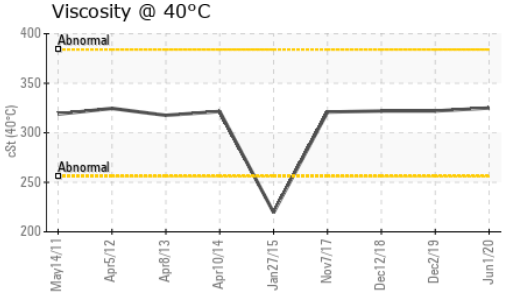
Water



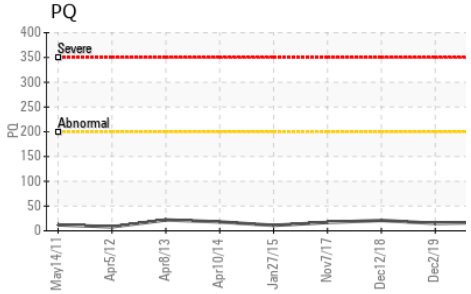
PQ



Viscosity @ 40°C



PQ



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045		**0.779**	0.788	0.900

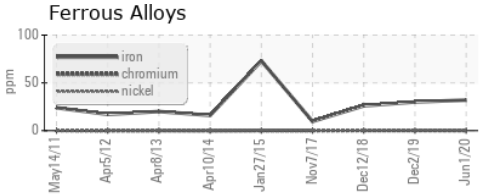
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	LIGHT
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	▲ **MODER**	LIGHT	NONE
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**	322	322.0

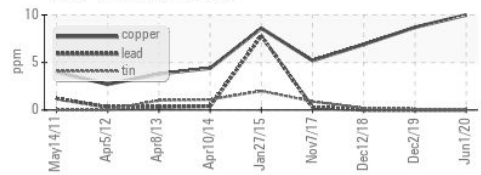
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

GRAPHS

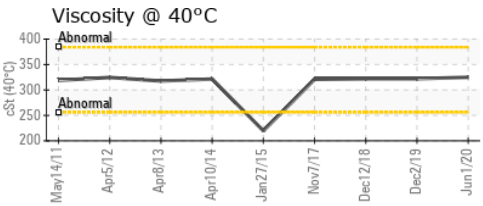
Ferrous Alloys



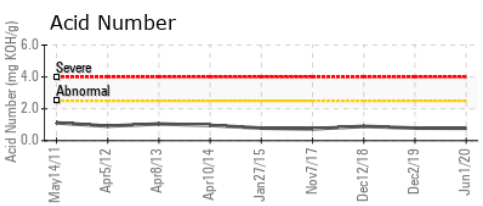
Non-ferrous Metals



Viscosity @ 40°C



Acid Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MHI023579 **Received** : 16 Jun 2020
Lab Number : 05000025 **Diagnosed** : 19 Jun 2020
Unique Number : 9065178 **Diagnostician** : Doug Bogart
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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