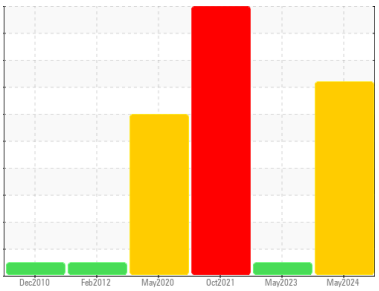
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

PROBLEM SUMMARY

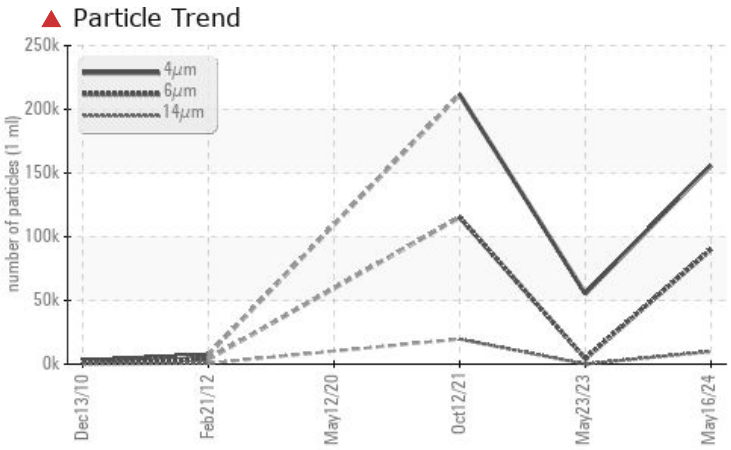
Sample Rating Trend



ISO

Machine Id
H-06
Component
Wind Turbine Gearbox
Fluid
ROYAL PURPLE SYNFILM GT 320 (65 GAL)

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. Resample at the next service interval to monitor.

PROBLEMATIC TEST RESULTS

Sample Status				SEVERE	NORMAL	SEVERE
Particles >6µm		ASTM D7647	>5000	▲ **90103**	4364	▲ 115273
Particles >14µm		ASTM D7647	>640	▲ **9922**	29	▲ 19618
Particles >21µm		ASTM D7647	>160	▲ **2628**	3	▲ 6608
Particles >38µm		ASTM D7647	>40	▲ **146**	1	▲ 1020
Oil Cleanliness		ISO 4406 (c)	>--/19/16	▲ **24/24/20**	23/19/12	▲ 25/24/21

Customer Id: MITWHI
Sample No.: MHI026402
Lab Number: 06204577
Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Angela Borella +1 800-237-1369
angela.borella@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.

HISTORICAL DIAGNOSIS

NORMAL

23 May 2023 Diag: Jonathan Hester
Resample at the next service interval to monitor.All component wear rates are normal. There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

WATER

12 Oct 2021 Diag: Angela Borella
Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil. We advise that you follow the water drain-off procedure for this component.All component wear rates are normal. There is a high amount of particulates present in the oil. High concentration of visible dirt/debris present in the oil. Excessive free water present. The AN level is acceptable for this fluid.

view report

WATER

12 May 2020 Diag: Doug Bogart
Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil. We advise that you follow the water drain-off procedure for this component. We were unable to perform a particle count due to a high concentration of particles present in this sample.All component wear rates are normal. High concentration of visible dirt/debris present in the oil. Excessive free water present. The AN level is acceptable for this fluid.

view report

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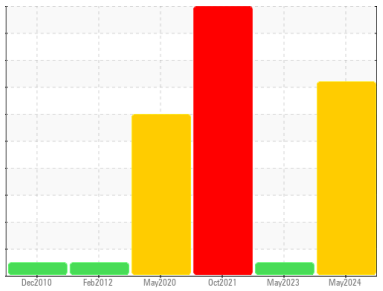
OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Machine Id
H-06
Component
Wind Turbine Gearbox
Fluid
ROYAL PURPLE SYNFILM GT 320 (65 GAL)

DIAGNOSIS

▲ Recommendation
Replace filter element and resample at later date. In case already attempted and cleanliness was not improved then proceed to replace oil. Resample at the next service interval to monitor.

Wear
All component wear rates are normal.

▲ Contamination
There is a high amount of particulates present in the oil.

Fluid Condition
The AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**MHI026402**	MHI021782	MHI017133
Sample Date		Client Info		**16 May 2024**	23 May 2023	12 Oct 2021
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**	NORMAL	SEVERE

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>200	**28**	10	43
Iron	ppm	ASTM D5185m	>200	**16**	12	23
Chromium	ppm	ASTM D5185m	>3	**0**	<1	<1
Nickel	ppm	ASTM D5185m	>3	**<1**	0	<1
Titanium	ppm	ASTM D5185m	>10	**0**	<1	0
Silver	ppm	ASTM D5185m		**0**	0	0
Aluminum	ppm	ASTM D5185m	>30	**<1**	2	0
Lead	ppm	ASTM D5185m	>15	**0**	0	0
Copper	ppm	ASTM D5185m	>75	**11**	3	10
Tin	ppm	ASTM D5185m	>10	**<1**	0	0
Antimony	ppm	ASTM D5185m	>5	**---**	---	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		**0**	0	<1
Barium	ppm	ASTM D5185m		**<1**	0	0
Molybdenum	ppm	ASTM D5185m		**1**	2	2
Manganese	ppm	ASTM D5185m		**<1**	0	<1
Magnesium	ppm	ASTM D5185m	90	**6**	7	13
Calcium	ppm	ASTM D5185m		**3**	0	0
Phosphorus	ppm	ASTM D5185m		**19**	0	27
Zinc	ppm	ASTM D5185m		**14**	0	0
Sulfur	ppm	ASTM D5185m		**21930**	21404	16199

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+30	**3**	2	6
Sodium	ppm	ASTM D5185m		**<1**	0	0
Potassium	ppm	ASTM D5185m	>20	**3**	1	<1
Water	%	ASTM D6304	>0.1	**0.003**	0.008	▲ 0.314
ppm Water	ppm	ASTM D6304	>1000	**29**	86	▲ 3140

FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**155969**	55314	211604
Particles >6µm		ASTM D7647	>5000	▲ **90103**	4364	▲ 115273
Particles >14µm		ASTM D7647	>640	▲ **9922**	29	▲ 19618
Particles >21µm		ASTM D7647	>160	▲ **2628**	3	▲ 6608
Particles >38µm		ASTM D7647	>40	▲ **146**	1	▲ 1020
Particles >71µm		ASTM D7647	>10	**13**	0	▲ 104
Oil Cleanliness		ISO 4406 (c)	>--/19/16	▲ **24/24/20**	23/19/12	▲ 25/24/21

OIL ANALYSIS REPORT

DIAMOND WTG ENGINEERING & SERVICES, INC.
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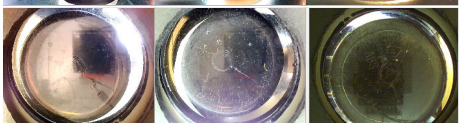
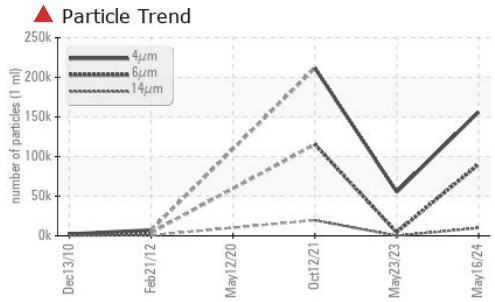
FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	0.25	**0.41**	0.36	0.44

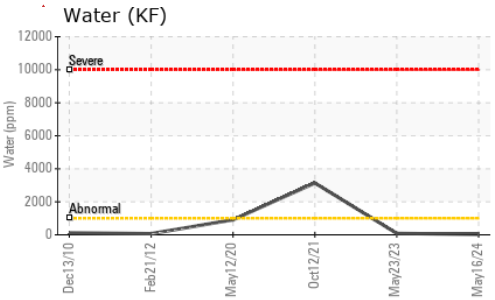
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**LIGHT**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	LIGHT
Sand/Dirt	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	0.2%
Free Water	scalar	*Visual		**NEG**	NEG	▲ 10.0

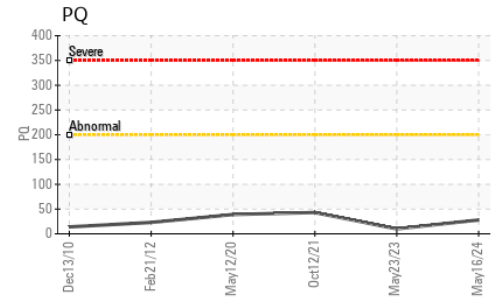
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	320	**327**	321	325

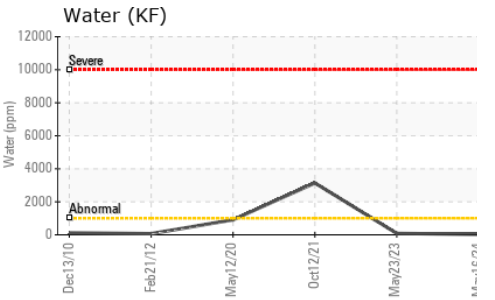
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

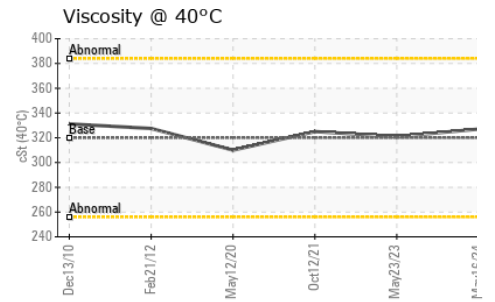
GRAPHS

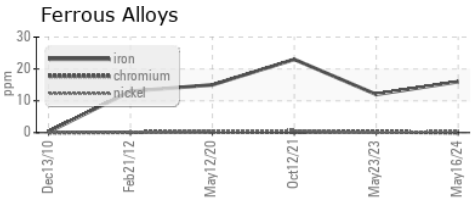


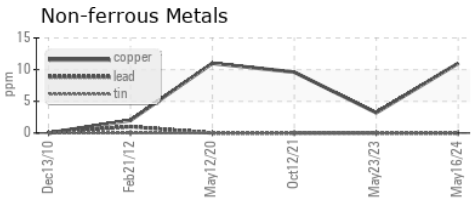


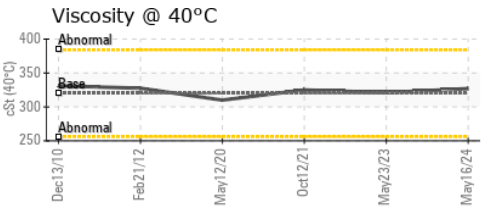


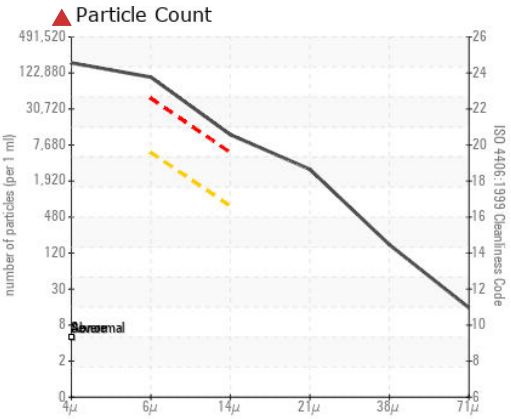


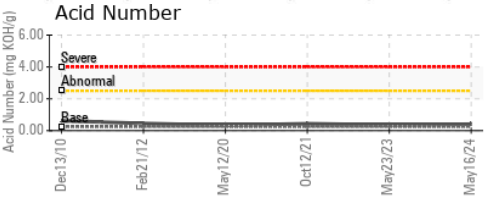












Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MHI026402
Lab Number : 06204577
Unique Number : 11072038
Test Package : IND 2 (Additional Tests: KF, PQ, PrtCount)

Received : 10 Jun 2024
Tested : 11 Jun 2024
Diagnosed : 12 Jun 2024 - Angela Borella

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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Report Id: MITWHI [WUSCAR] 06204577 (Generated: 06/12/2024 17:23:19) Rev: 1
Contact/Location: WESLEY CAMPBELL - MITWHI