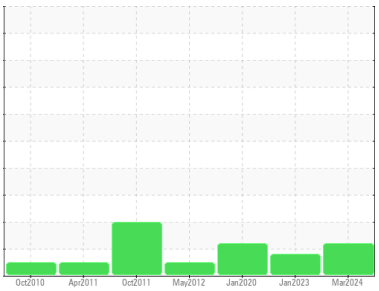
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Machine Id
C-05
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.

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.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**MHI021770**	MHI021724	MHI009988
Sample Date		Client Info		**20 Mar 2024**	26 Jan 2023	29 Jan 2020
Machine Age	hrs	Client Info		**0**	0	0
Oil Age	hrs	Client Info		**0**	0	0
Oil Changed		Client Info		**N/A**	N/A	Not Changd
Sample Status				**ABNORMAL**	ATTENTION	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>200	**21**	12	29
Iron	ppm	ASTM D5185m	>200	**2**	4	11
Chromium	ppm	ASTM D5185m	>3	**0**	0	<1
Nickel	ppm	ASTM D5185m	>3	**<1**	0	<1
Titanium	ppm	ASTM D5185m	>10	**0**	0	0
Silver	ppm	ASTM D5185m		**0**	0	0
Aluminum	ppm	ASTM D5185m	>30	**0**	0	0
Lead	ppm	ASTM D5185m	>15	**0**	0	0
Copper	ppm	ASTM D5185m	>75	**29**	8	20
Tin	ppm	ASTM D5185m	>10	**0**	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		**0**	<1	<1
Manganese	ppm	ASTM D5185m		**<1**	<1	0
Magnesium	ppm	ASTM D5185m	90	**<1**	<1	<1
Calcium	ppm	ASTM D5185m		**<1**	<1	<1
Phosphorus	ppm	ASTM D5185m		**12**	14	13
Zinc	ppm	ASTM D5185m		**6**	0	0
Sulfur	ppm	ASTM D5185m		**20477**	19746	15488

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+30	**2**	2	2
Sodium	ppm	ASTM D5185m		**<1**	0	0
Potassium	ppm	ASTM D5185m	>20	**2**	0	0
Water	%	ASTM D6304	>0.1	**0.001**	0.005	0.002
ppm Water	ppm	ASTM D6304	>1000	**12**	58.0	19.7

FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**35563**	21225	57495
Particles >6µm		ASTM D7647	>5000	▲ **11473**	● 5532	▲ 14577
Particles >14µm		ASTM D7647	>640	● **780**	401	▲ 1011
Particles >21µm		ASTM D7647	>160	**143**	71	▲ 297
Particles >38µm		ASTM D7647	>40	**5**	1	20
Particles >71µm		ASTM D7647	>10	**2**	0	1
Oil Cleanliness		ISO 4406 (c)	>--/19/16	▲ **22/21/17**	● 22/20/16	▲ 23/21/17

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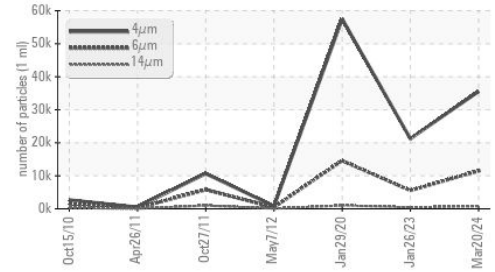
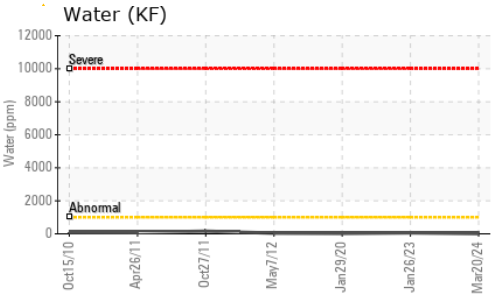
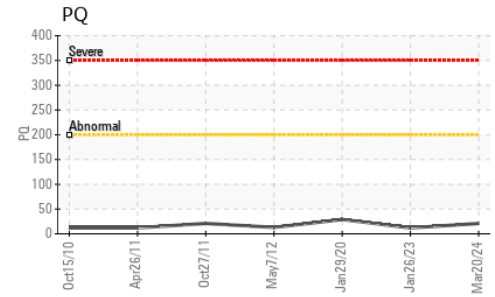
Particle Trend



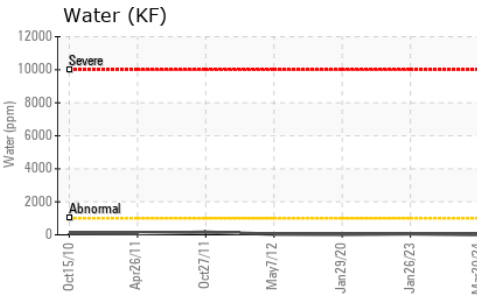
Water (KF)



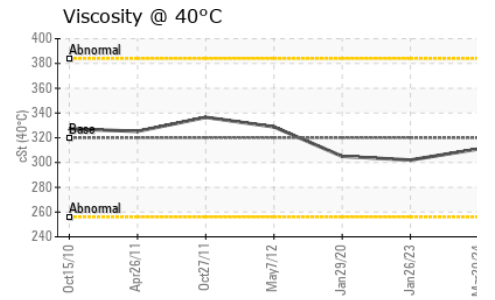
PQ



Water (KF)



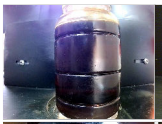
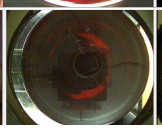
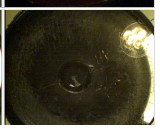
Viscosity @ 40°C



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045	0.25	**0.38**	0.42	0.371

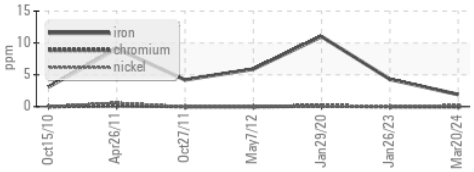
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt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

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	320	**311**	302	305

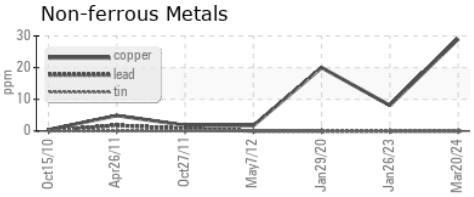
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

GRAPHS

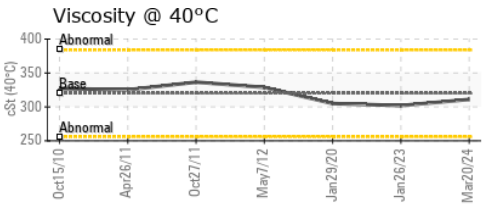
Ferrous Alloys



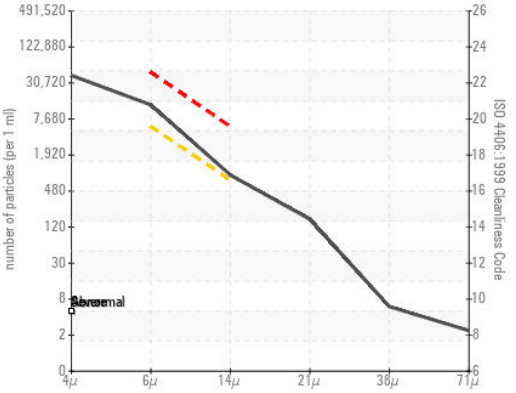
Non-ferrous Metals



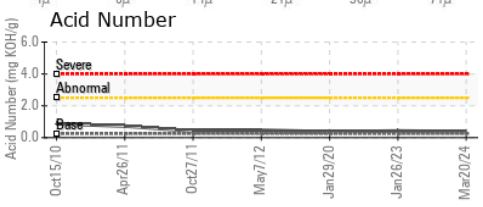
Viscosity @ 40°C



Particle Count



Acid Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MHI021770
Lab Number : 06204595
Unique Number : 11072056
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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