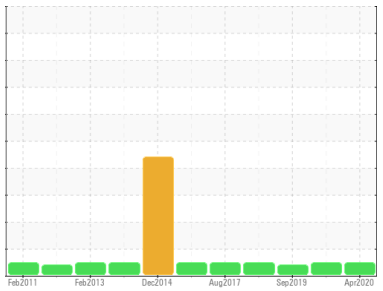
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Machine Id
A-87
Component
Wind Turbine Gearbox
Fluid
MITSUBISHI Daphne Alpha Winforce (--- LTR)

DIAGNOSIS

Recommendation
Resample at the next service interval to monitor.

Wear
All component wear rates are normal.

Contamination
There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable.

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

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**MHI023593**	MHI019078	MHI018976
Sample Date		Client Info		**07 Apr 2020**	11 Oct 2019	30 Sep 2019
Machine Age	hrs	Client Info		**0**	0	88444
Oil Age	hrs	Client Info		**92595**	88812	0
Oil Changed		Client Info		**Not Changd**	Not Changd	Not Changd
Sample Status				**NORMAL**	NORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>200	**14**	18	14
Iron	ppm	ASTM D5185m	>200	**15**	25	14
Chromium	ppm	ASTM D5185m		**<1**	<1	<1
Nickel	ppm	ASTM D5185m		**<1**	<1	<1
Titanium	ppm	ASTM D5185m		**0**	0	0
Silver	ppm	ASTM D5185m		**0**	0	0
Aluminum	ppm	ASTM D5185m		**0**	0	<1
Lead	ppm	ASTM D5185m		**0**	<1	<1
Copper	ppm	ASTM D5185m	>75	**2**	7	2
Tin	ppm	ASTM D5185m		**0**	<1	<1
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		**2**	<1	<1
Manganese	ppm	ASTM D5185m		**<1**	<1	<1
Magnesium	ppm	ASTM D5185m		**0**	<1	0
Calcium	ppm	ASTM D5185m		**2**	2	0
Phosphorus	ppm	ASTM D5185m		**264**	326	288
Zinc	ppm	ASTM D5185m		**1**	12	<1
Sulfur	ppm	ASTM D5185m		**3634**	4674	3454

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+30	**2**	1	3
Sodium	ppm	ASTM D5185m		**<1**	<1	<1
Potassium	ppm	ASTM D5185m	>20	**5**	0	1
Water	%	ASTM D6304	>0.1	**0.005**	0.008	0.007
ppm Water	ppm	ASTM D6304	>1000	**51.7**	89.2	76.8

FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**4808**	48969	---
Particles >6µm		ASTM D7647	>5000	**458**	4333	---
Particles >14µm		ASTM D7647	>640	**23**	25	---
Particles >21µm		ASTM D7647	>160	**5**	5	---
Particles >38µm		ASTM D7647	>40	**0**	1	---
Particles >71µm		ASTM D7647	>10	**0**	0	---
Oil Cleanliness		ISO 4406 (c)	>--/19/16	**19/16/12**	23/19/12	---

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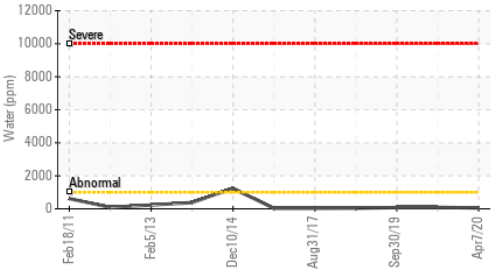
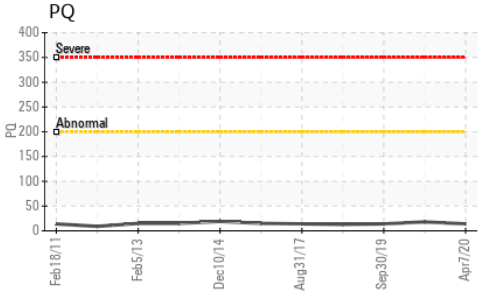
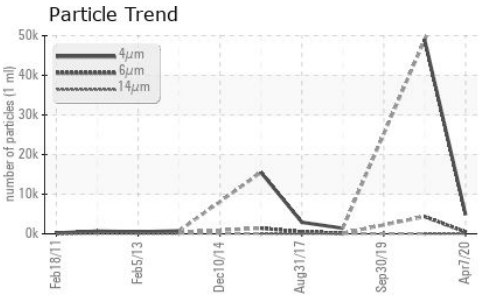
Water (KF)



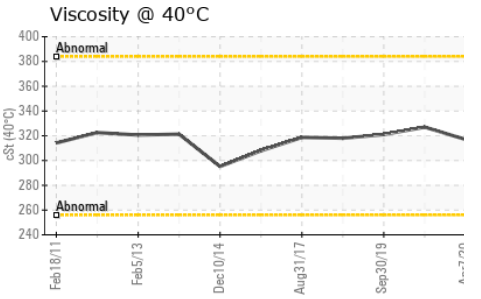
PQ



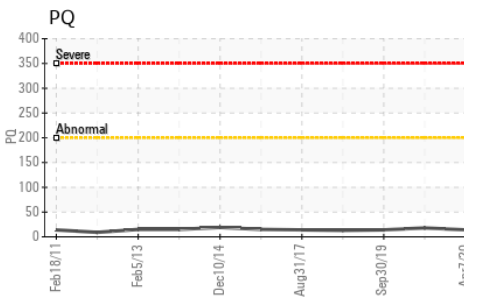
Particle Trend



Viscosity @ 40°C



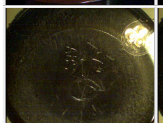
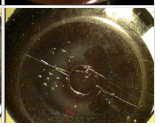
PQ



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045		**0.751**	0.835	0.772

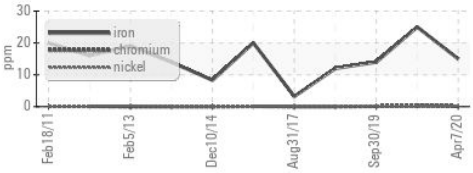
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	▲ MODER
Sand/Dirt	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		**317**	327	321

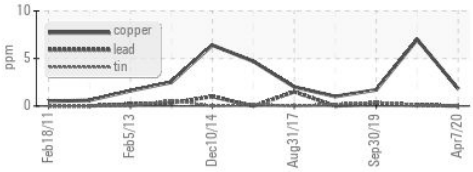
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

GRAPHS

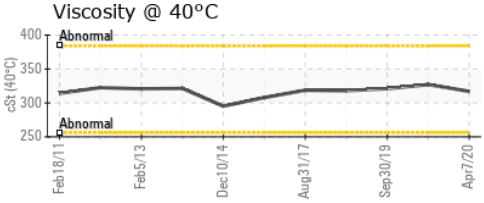
Ferrous Alloys



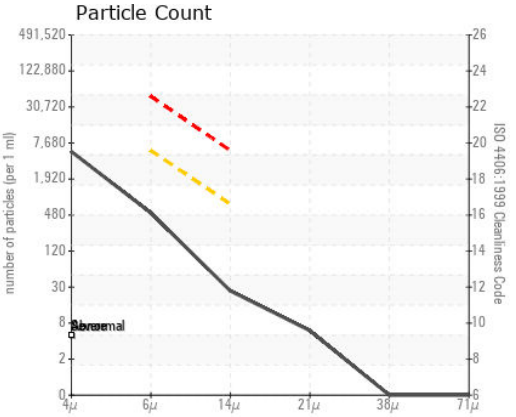
Non-ferrous Metals



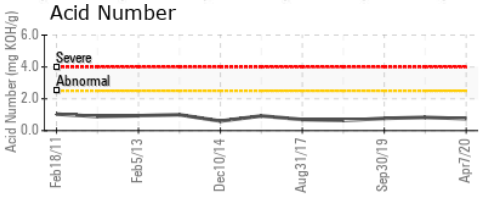
Viscosity @ 40°C



Particle Count



Acid Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : MHI023593
Lab Number : 04958630
Unique Number : 8998737
Test Package : IND 2 (Additional Tests: KF, PQ, PrtCount)

Received : 20 Apr 2020
Tested : 21 Apr 2020
Diagnosed : 21 Apr 2020 - Jonathan Hester

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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