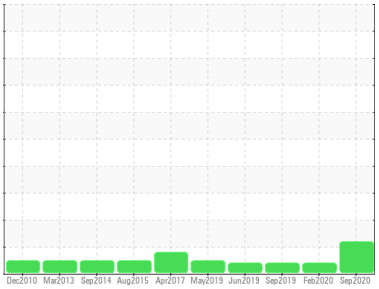
DIAMOND WTG ENGINEERING & SERVICES, INC.
a group company of MITSUBISHI HEAVY INDUSTRIES, LTD.

OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Machine Id
T-05
Component
Wind Turbine Gearbox
Fluid
MITSUBISHI Daphne Alpha Winforce (70 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		**MHI017982**	MHI018657	MHI04811209
Sample Date		Client Info		**16 Sep 2020**	25 Feb 2020	16 Sep 2019
Machine Age	hrs	Client Info		**0**	0	0
Oil Age	hrs	Client Info		**0**	0	0
Oil Changed		Client Info		**Not Changd**	N/A	N/A
Sample Status				**ABNORMAL**	ABNORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184	>200	**20**	20	25
Iron	ppm	ASTM D5185m	>200	**22**	27	25
Chromium	ppm	ASTM D5185m		**<1**	<1	<1
Nickel	ppm	ASTM D5185m		**<1**	0	0
Titanium	ppm	ASTM D5185m		**<1**	0	0
Silver	ppm	ASTM D5185m		**0**	<1	0
Aluminum	ppm	ASTM D5185m		**0**	0	<1
Lead	ppm	ASTM D5185m		**0**	<1	<1
Copper	ppm	ASTM D5185m	>75	**3**	4	3
Tin	ppm	ASTM D5185m		**<1**	<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		**3**	1	1
Barium	ppm	ASTM D5185m		**0**	0	0
Molybdenum	ppm	ASTM D5185m		**<1**	<1	<1
Manganese	ppm	ASTM D5185m		**<1**	<1	<1
Magnesium	ppm	ASTM D5185m		**<1**	<1	0
Calcium	ppm	ASTM D5185m		**2**	0	<1
Phosphorus	ppm	ASTM D5185m		**359**	355	344
Zinc	ppm	ASTM D5185m		**1**	0	0
Sulfur	ppm	ASTM D5185m		**4874**	5043	4572

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+30	**3**	3	4
Sodium	ppm	ASTM D5185m		**1**	0	0
Potassium	ppm	ASTM D5185m	>20	**<1**	<1	<1
Water	%	ASTM D6304	>0.1	**0.007**	0.006	0.007
ppm Water	ppm	ASTM D6304	>1000	**73.1**	60.5	78.3

FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		**45060**	---	90121
Particles >6µm		ASTM D7647	>5000	▲ **10388**	---	▲ 11278
Particles >14µm		ASTM D7647	>640	▲ **758**	---	432
Particles >21µm		ASTM D7647	>160	▲ **188**	---	63
Particles >38µm		ASTM D7647	>40	**8**	---	3
Particles >71µm		ASTM D7647	>10	**1**	---	3
Oil Cleanliness		ISO 4406 (c)	>--/19/16	▲ **23/21/17**	---	▲ 24/21/16

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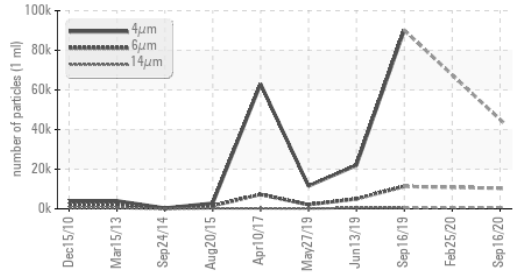
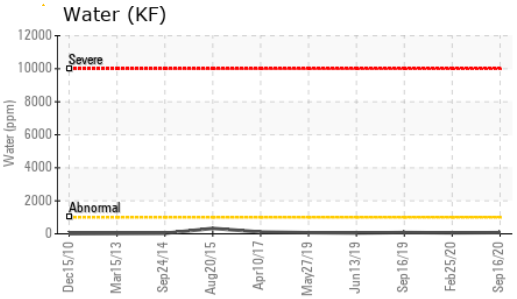
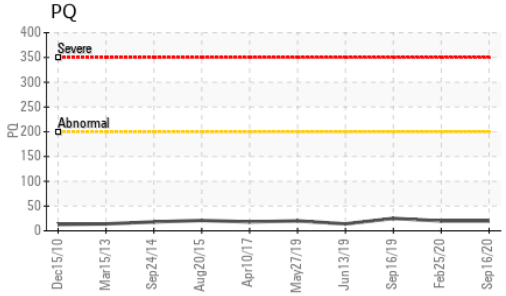
Particle Trend



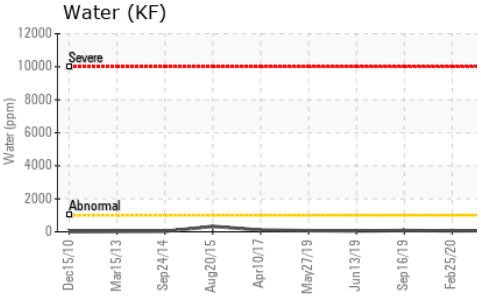
Water (KF)



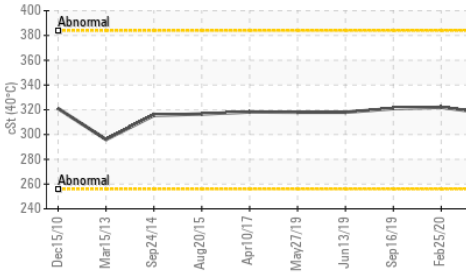
PQ



Water (KF)



Viscosity @ 40°C



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045		**0.828**	0.857	0.831

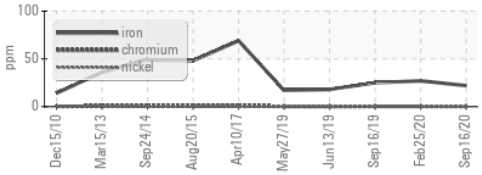
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**NONE**	LIGHT	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**LIGHT**	▲ MODER	LIGHT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

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445		**317**	322	321

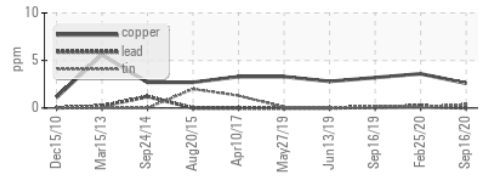
SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

GRAPHS

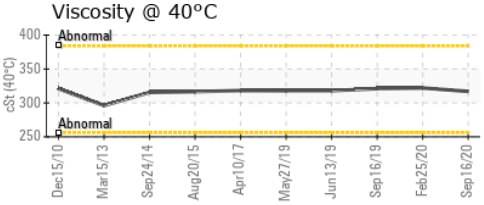
Ferrous Alloys



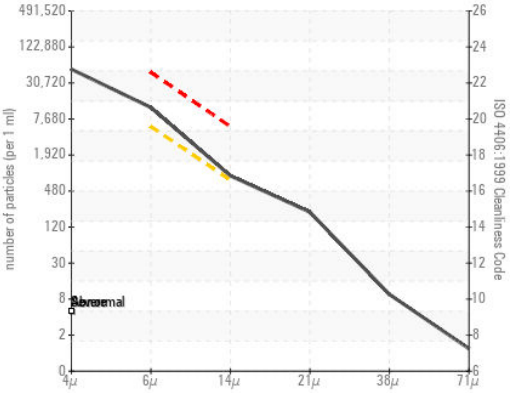
Non-ferrous Metals



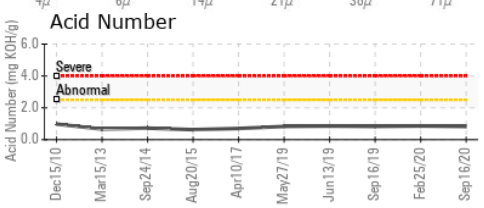
Viscosity @ 40°C



Particle Count



Acid Number



Certificate L2367

Laboratory	: WearCheck USA - 501 Madison Ave., Cary, NC 27513		
Sample No.	: MHI017982	**Recieved**	: 29 Sep 2020
Lab Number	: 05076531	**Diagnosed**	: 01 Oct 2020
Unique Number	: 9191762	**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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