

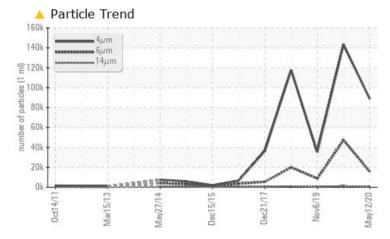
PROBLEM SUMMARY

Area SWEETWATER Machine Id D092 Component

Wind Turbine Gearbox

MITSUBISHI Daphne Alpha Winforce (60 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.

PROBLEMATIC TEST RESULTS							
Sample Status			ABNORMAL	ABNORMAL	ABNORMAL		
Particles >6µm	ASTM D7647 >	>5000	<u> </u>	4 7353	▲ 8774		
Oil Cleanliness	ISO 4406 (c) >	>/19/16	 24/21/16	🔺 24/23/17	<u> </u>		

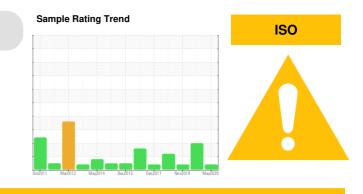
Customer Id: MITROS Sample No.: MHI018342 Lab Number: 04984694 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Don Baldridge +1 <u>don.b505@comcast.net</u>

To change component or sample information: Customer Service +1 1-800-237-1369 <u>customerservice@wearcheck.com</u>



RECOMMENDE	D 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



23 Mar 2020 Diag: Don Baldridge

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 particulates present in the oil. The AN level is acceptable for this fluid.



view report

06 Nov 2019 Diag: Don Baldridge



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.

01 Oct 2018 Diag: Don Baldridge



Re-sample to verify the actual oil condition. Replace filter elements. Change oil if cleanliness level does not improve after replacing the filter(s).All component wear rates are normal. There is a high amount of particulates present in the oil. The AN level is acceptable for this fluid.









OIL ANALYSIS REPORT

a group company of 🙏 MITSUBISHI HEAVY INDUSTRIES, LTD.

Area SWEETWATER Machine Id D092 Component

Wind Turbine Gearbox

Fluid MITSUBISHI Daphne Alpha Winforce (60 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 silt (particulates < 14 microns in size) present in the oil.

Fluid Condition

The AN level is acceptable for this fluid.

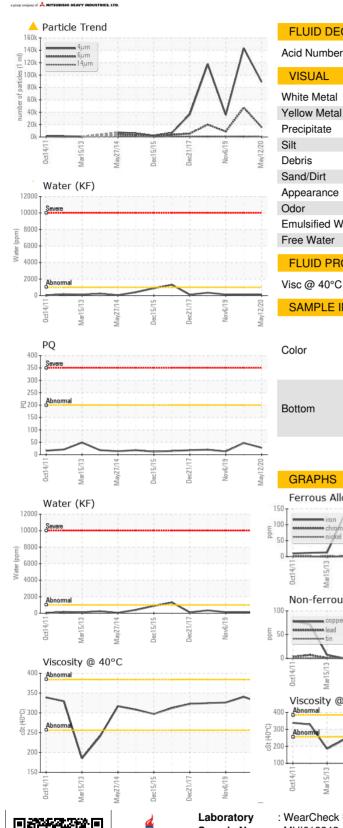
AL) SAMPLE INFORMATION method imit/base current historyl historyl Sample Number Client Info 12 May 2020 23 Mar 2020 06 Nov 2019 Machine Age hrs Client Info 12 May 2020 23 Mar 2020 06 Nov 2019 Oil Age hrs Client Info 0 0 32130 Oil Age hrs Client Info N/A N/A N/A Sample Status Imit/base current historyl historyl Yon ppm ASTM D8184 200 28 47 13 Yon ppm ASTM D8185 >200 37 42 24 Chromium ppm ASTM D8185 >200 37 42 24 Chromium ppm ASTM D8185 >200 37 42 24 Chromium ppm ASTM D5185 0 0 0 1 1 1 1 1 1 1 1 1 1							
SAMPLE INFORMATION method limit/base current history1 history2 Sample Number Client Info MHI018342 MHI018358 MHI018342 MHI018342 MEIN051850 O MIN01858 MIN018585 MIN0185855 MIN018585 MIN018585	AL)						
Sample Date Client Info 12 May 2020 23 Mar 2020 06 Nov 2019 Machine Age hrs Client Info 0 0 32130 Oil Age hrs Client Info 36206 35096 0 Oil Changed Client Info N/A N/A N/A ABNORMAL	SAMPLE INFORM			limit/base	current	history1	history2
Sample Date Client Info 12 May 2020 23 Mar 2020 06 Nov 2019 Machine Age hrs Client Info 0 0 32130 Oil Age hrs Client Info 36206 35096 0 Oil Changed Client Info N/A N/A N/A ABNORMAL	Sample Number		Client Info		MHI018342	MHI018358	MHI188252
Machine Age Dil Age Dil Age Dil Age Dil Age Dil Age Agmole StatusClient Info Client Info N/AS6206 S6206 N/A35096 N/A0Dil Changed Sample StatusClient Info N/AN/AN/AN/ASample StatusImage Astm DE184 Scample StatusMethod Astm DE185 Scample StatusAstm DE186 CurrentCurrentNistory1PQAstm DE186 N/AS200284713ron ChomiumppmAstm DE186 Astm DE1865S200374224ChomiumppmAstm DE1865 Astm DE18650<1	•		Client Info		12 May 2020	23 Mar 2020	06 Nov 2019
Dil Changed Client Info N/A N/A N/A Sample Status method imit/base current history1 ABNORMAL WEAR METALS method imit/base current history1 history2 PQ ASTM D5186m >200 28 47 13 ron ppm ASTM D5186m >200 37 42 24 Chromium ppm ASTM D5186m 0 <1		hrs	Client Info		-	0	32130
Dil ChangedClient InfoN/AN/AN/AN/ASample StatusIIABNORMALABNORMALABNORMALABNORMALABNORMALWEAR METALSmethodIimil/basecurrenthistory1history2PQASTM D8184>200284713ronppmASTM D8185>200374224ChromiumppmASTM D51850<1	Dil Age	hrs	Client Info		36206	35096	0
Sample StatusImage: MethodABNORMALABNORMALABNORMALABNORMALWEAR METALSmethodlimit/basecurrenthistory1history2PQASTM DB184>200284713ronppmASTM DB185m<20	-		Client Info		N/A	N/A	N/A
PQ ASTM D8184 >200 28 47 13 ron ppm ASTM D5185m >200 37 42 24 Chromium ppm ASTM D5185m 0 <1	-				ABNORMAL	ABNORMAL	ABNORMAL
ron ppm ASTM D5165m >200 37 42 24 Chromium ppm ASTM D5185m <1	WEAR METALS		method	limit/base	current	history1	history2
Dromium ppm ASTM D5185m <1 <1 <1 <1 <1 Nickel ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m 0 0 0 0 Auminum ppm ASTM D5185m 0 <1	PQ		ASTM D8184	>200	28	47	13
Nickel pm ASTM D5185m 0 <1 2 Titanium ppm ASTM D5185m 0 0 0 Silver ppm ASTM D5185m 0 <1	ron	ppm	ASTM D5185m	>200	37	42	24
NickelpmASTM D5185m0<12FitaniumppmASTM D5185m000SilverppmASTM D5185m0<1	Chromium				<1	<1	<1
TitaniumppmASTM D5185m000SilverppmASTM D5185m0<1	Nickel				0	<1	2
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Aluminum ppm ASTM D5185m 0 <1 <1 Lead ppm ASTM D5185m >75 8 7 8 Copper ppm ASTM D5185m >75 8 7 8 Tin ppm ASTM D5185m >75 8 7 8 Antimony ppm ASTM D5185m 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m <11	Silver		ASTM D5185m			0	0
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Copper ppm ASTM D5185m >75 8 7 8 Fin ppm ASTM D5185m 0 0 0 0 Antimony ppm ASTM D5185m 0 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m <1 <1 <1 <1 Barium ppm ASTM D5185m <1 <1 <1 <1 <1 Barium ppm ASTM D5185m <1 <1 <1 <1 <1 Barium ppm ASTM D5185m <1 1 <1 <1 <1 Vanganesic ppm ASTM D5185m 374 389 307 ContAdminuntry ppm ASTM D5185m >20 0 <1 6 Soliton ppm ASTM D5185m >2	_ead		ASTM D5185m		0	0	<1
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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					0	0	0
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m <1 <1 <1 <1 Barium ppm ASTM D5185m 4 4 3 Barium ppm ASTM D5185m 4 4 3 Manganese ppm ASTM D5185m 4 4 3 Manganese ppm ASTM D5185m <1 <1 <1 <1 Obsphorus ppm ASTM D5185m <1 <1 <1 <1 Phosphorus ppm ASTM D5185m 374 389 307 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 0 <1 6 Otassium ppm ASTM D5185m >20 0 <1 6 Otastasium ppm <td>-</td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>	-				-		
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Barium ppm ASTM D5185m 0 0 0 Wolybdenum ppm ASTM D5185m 4 4 3 Wanganese ppm ASTM D5185m 4 4 3 Wanganese ppm ASTM D5185m <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 4 4 3 Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m <1 <1 0 Calcium ppm ASTM D5185m <1 1 <1 0 Calcium ppm ASTM D5185m 374 389 307 Zinc ppm ASTM D5185m 374 389 307 Zinc ppm ASTM D5185m 374 389 307 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >20 0 <1 6 Vater % ASTM D5185m >20 0 <10 0.01 0.012 ppm ASTM D6304 >0.1 0.009 0.010 0.012 ppm ASTM D647	Boron	ppm	ASTM D5185m		<1	<1	<1
Manganese ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m		0	0	0
Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m <1	Nolybdenum	ppm	ASTM D5185m		4	4	3
Magnesium ppm ASTM D5185m <1 <1 <1 Phosphorus ppm ASTM D5185m 374 389 307 Zinc ppm ASTM D5185m 0 0 38 Zinc ppm ASTM D5185m 0 0 38 Sulfur ppm ASTM D5185m 0 0 38 Sulfur ppm ASTM D5185m 4863 5253 3987 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >20 0 <11	-	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 374 389 307 Zinc ppm ASTM D5185m 0 0 38 Sulfur ppm ASTM D5185m 4863 5253 3987 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >20 0 <10 <100 <11 Potassium ppm ASTM D5185m >20 0 <10 0.012 Opm Water ppm ASTM D6304 >0.0 94.7 106.0 127.5 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 5000 15701 47353 <td>-</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td><1</td> <td><1</td> <td>0</td>	-	ppm	ASTM D5185m		<1	<1	0
Phosphorus ppm ASTM D5185m 374 389 307 Zinc ppm ASTM D5185m 0 0 38 Sulfur ppm ASTM D5185m 4863 5253 3987 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >+30 3 5 3 Potassium ppm ASTM D5185m >20 0 <10 0.010 0.012 Potassium ppm ASTM D5185m >20 0 <10 0.010 0.012 Potassium ppm ASTM D5185m >20 0 <10 0.012 Potassium ppm ASTM D6304 >0.1 0.009 0.010 0.012 Particles >4µm ASTM D7647 >5000 1570	Calcium	ppm	ASTM D5185m		1	1	<1
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SulfurppmASTM D5185m486352533987CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+30353SodiumppmASTM D5185m>+30353PotassiumppmASTM D5185m>200<1			ASTM D5185m		0	0	38
Silicon ppm ASTM D5185m >+30 3 5 3 Sodium ppm ASTM D5185m >+30 0 0 <1	Sulfur		ASTM D5185m		4863	5253	3987
Sodium ppm ASTM D5185m 0 0 <1 Potassium ppm ASTM D5185m >20 0 <1	CONTAMINANTS	3	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 <1 6 Water % ASTM D6304 >0.1 0.009 0.010 0.012 opm Water ppm ASTM D6304 >1000 94.7 106.0 127.5 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 15701 47353 8774 Particles >6µm ASTM D7647 >640 424 1255 538 Particles >21µm ASTM D7647 >160 66 149 130 Particles >38µm ASTM D7647 >40 8 10 12 Particles >71µm ASTM D7647 >10 5 7 0	Silicon	ppm	ASTM D5185m	>+30	3	5	3
Water % ASTM D6304 >0.1 0.009 0.010 0.012 opm Water ppm ASTM D6304 >1000 94.7 106.0 127.5 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 15701 47353 8774 Particles >6µm ASTM D7647 >640 424 1255 538 Particles >14µm ASTM D7647 >160 66 149 130 Particles >21µm ASTM D7647 >40 8 10 12 Particles >71µm ASTM D7647 >10 5 7 0	Sodium	ppm	ASTM D5185m		0	0	<1
opm Water ppm ASTM D6304 >1000 94.7 106.0 127.5 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 15701 47353 8774 Particles >6µm ASTM D7647 >640 424 1255 538 Particles >14µm ASTM D7647 >160 66 149 130 Particles >21µm ASTM D7647 >40 8 10 12 Particles >38µm ASTM D7647 >10 5 7 0	Potassium	ppm	ASTM D5185m	>20	0	<1	6
FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 88747 143419 35455 Particles >6µm ASTM D7647 >5000 15701 47353 8774 Particles >14µm ASTM D7647 >640 424 1255 538 Particles >21µm ASTM D7647 >160 66 149 130 Particles >38µm ASTM D7647 >40 8 10 12 Particles >71µm ASTM D7647 >10 5 7 0	Water	%	ASTM D6304	>0.1	0.009	0.010	0.012
Particles >4μm ASTM D7647 88747 143419 35455 Particles >6μm ASTM D7647 >5000 15701 47353 8774 Particles >14μm ASTM D7647 >640 424 1255 538 Particles >21μm ASTM D7647 >160 66 149 130 Particles >38μm ASTM D7647 >40 8 10 12 Particles >71μm ASTM D7647 >10 5 7 0	opm Water	ppm	ASTM D6304	>1000	94.7	106.0	127.5
Particles >6µm ASTM D7647 >5000 ▲ 15701 ▲ 47353 ▲ 8774 Particles >14µm ASTM D7647 >640 424 ▲ 1255 538 Particles >21µm ASTM D7647 >160 66 ▲ 149 130 Particles >38µm ASTM D7647 >40 8 ▲ 10 12 Particles >71µm ASTM D7647 >10 5 ▲ 7 0	FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >14μm ASTM D7647 >640 424 1255 538 Particles >21μm ASTM D7647 >160 66 149 130 Particles >38μm ASTM D7647 >40 8 10 12 Particles >71μm ASTM D7647 >10 5 7 0	Particles >4µm		ASTM D7647		88747	143419	35455
Particles >21μm ASTM D7647 >160 66 149 130 Particles >38μm ASTM D7647 >40 8 10 12 Particles >71μm ASTM D7647 >10 5 7 0	Particles >6µm		ASTM D7647	>5000	<u> </u>	4 7353	▲ 8774
Particles >38μm ASTM D7647 >40 8 10 12 Particles >71μm ASTM D7647 >10 5 7 0	Particles >14µm		ASTM D7647	>640	424	1255	538
Particles >71μm ASTM D7647 >10 5 4 7 0	Particles >21µm		ASTM D7647	>160	66	1 49	130
	Particles >38µm		ASTM D7647	>40	8	1 0	12
Dil Cleanliness ISO 4406 (c) >/19/16 🔺 24/21/16 🔺 24/23/17 🔺 22/20/16	Particles >71µm		ASTM D7647	>10	5	<u> </u>	0
	Oil Cleanliness		ISO 4406 (c)	>/19/16	4/21/16	▲ 24/23/17	▲ 22/20/16

Sample Rating Trend

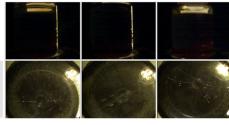
ISO

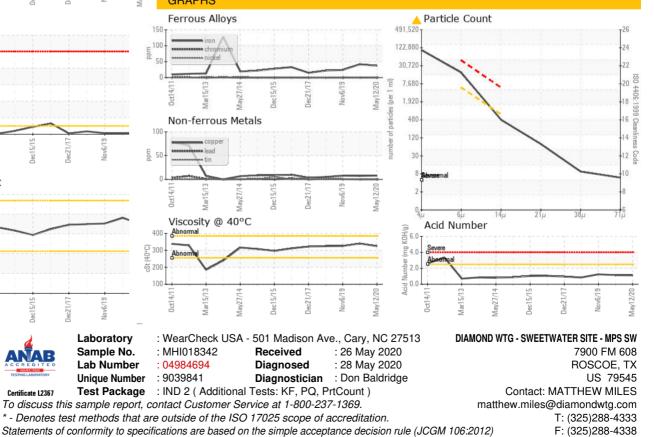


OIL ANALYSIS REPORT



FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045		1.117	1.137	1.247
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	MODER	MODER	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	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 PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445		325	340	326
SAMPLE IMAGES	;	method	limit/base	current	history1	history2





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Certificate L2367

Contact/Location: MATTHEW MILES - MITROS