

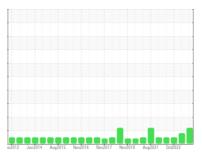
PROBLEM SUMMARY

HIGHLAND [600380493] Machine Id 15WEA80822

Component
Wind Turbine Gearbox
Fluid

MOBIL XMP 320 (--- LTR)

Sample Rating Trend





COMPONENT CONDITION SUMMARY

No relevant graphs to display

RECOMMENDATION

We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. We were unable to perform a particle count due to metal particles present in this sample.

PROBLEMATIC TEST RESULTS

Sample Status

ABNORMAL

ABNORMAL

NORMAL

White Metal

scalar *Visual

NONE

MODER

LIGHT

VLITE

Customer Id: NORHIG Sample No.: NX05928207 Lab Number: 05928207 Test Package: IND 2

To manage this report scan the QR code

To discuss the diagnosis or test data:

Don Baldridge +1 don.b505@comcast.net

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

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Inspect Wear Source			?	We advise that you inspect for the source(s) of wear.
Change Filter			?	We recommend you service the filters on this component if applicable.
Alert			?	We were unable to perform a particle count due to metal particles present in this sample.

HISTORICAL DIAGNOSIS

21 Dec 2022 Diag: Doug Bogart

ISO



We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. 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. The condition of the oil is suitable for further service.



21 Oct 2022 Diag: Jonathan Hester

NORMAL



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



09 May 2022 Diag: Don Baldridge

NORMAL



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





OIL ANALYSIS REPORT

SAMPLE INFORMATION

Sample Number

Sample Rating Trend

limit/base

method

Client Info

VISUAL METAL



history2

NX05700248

history1

NX05766522

HIGHLAND [600380493] Machine Id 15WEA80822

Component

Wind Turbine Gearbox

MOBIL XMP 320 (--- LTR)

DIAGNOSIS

Recommendation

We recommend you service the filters on this component if applicable. Resample at the next service interval to monitor. We were unable to perform a particle count due to metal particles present in this sample.

Wear

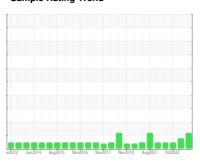
Moderate concentration of visible metal present. All component wear rates are normal.

Contamination

No other contaminants were detected in the oil.

Fluid Condition

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



current

NX05928207

Machine Age mths Client Info 0 0 0 Oil Age mths Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A Sample Status Death of the status Method limit/base current history1 history2 PQ ASTM DSIBS Method limit/base current history1 history2 PQ ASTM DSIBS 150 50 84 81 Chromium ppm ASTM DSIBS >150 50 84 81 Nickel ppm ASTM DSIBS >10 0 <1	Sample Date		Client Info		17 May 2023	21 Dec 2022	21 Oct 2022
Oil Changed Sample Status Client Info N/A NORMAL NORMAL	Machine Age	mths	Client Info		0	0	0
Sample Status method limit/base current history1 history2 PQ ASTM D8184 >80 12 15 4 Iron ppm ASTM D8185m >150 50 84 81 Chromium ppm ASTM D5185m >10 0 <1 <1 Nickel ppm ASTM D5185m >10 0 <1 <0 Rickel ppm ASTM D5185m >10 0 <1 <0 Rickel ppm ASTM D5185m >10 0 <0 <0 Rickel ppm ASTM D5185m >10 0 0 <0 Rickel ppm ASTM D5185m >20 0 <1 0 Lead ppm ASTM D5185m >20 0 <1 0 Copper ppm ASTM D5185m >20 0 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0	Oil Age	mths	Client Info		0	0	0
WEAR METALS method limit/base current history1 history2 PQ ASTM D8184 >80 12 15 4 Iron ppm ASTM D8185m >150 50 84 81 Chromium ppm ASTM D8185m >10 0 <1 0 Nickel ppm ASTM D8185m >10 0 <1 0 Sliver ppm ASTM D8185m >10 0 0 0 Aluminum ppm ASTM D8185m >10 0 0 0 Aluminum ppm ASTM D8185m >10 0 0 0 Aluminum ppm ASTM D8185m >20 0 <1 0 Copper ppm ASTM D8185m >10 0 <1 0 Copper ppm ASTM D8185m 0 0 0 0 Cadadium ppm ASTM D8185m 0 0 0 0 </th <th>Oil Changed</th> <th></th> <th>Client Info</th> <th></th> <th>N/A</th> <th>N/A</th> <th>N/A</th>	Oil Changed		Client Info		N/A	N/A	N/A
PQ ASTM D8184 >80 12 15 4 Iron ppm ASTM D5185m >150 50 84 81 Chromium ppm ASTM D5185m >10 0 <1	Sample Status				ABNORMAL	ABNORMAL	NORMAL
Iron	WEAR METALS		method	limit/base	current	history1	history2
Chromium ppm ASTM D5185m >5 <1	PQ		ASTM D8184	>80	12	15	4
Nickel ppm ASTM D5185m >10 0 <1	Iron	ppm	ASTM D5185m	>150	50	84	81
Titanium ppm ASTM D5185m >10 0 0 0 Silver ppm ASTM D5185m 0 0 0 0 Aluminum ppm ASTM D5185m >10 0 0 0 Caded ppm ASTM D5185m >50 1 1 2 Tin ppm ASTM D5185m >10 0 <1	Chromium	ppm	ASTM D5185m	>5	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>10	0	<1	0
Aluminum ppm ASTM D5185m >10 0 0 0 Lead ppm ASTM D5185m >20 0 <1	Titanium	ppm	ASTM D5185m	>10	0	0	0
Lead ppm ASTM D5185m >20 0 <1	Silver	ppm	ASTM D5185m		0	0	0
Copper ppm ASTM D5185m >50 1 1 2 Tin ppm ASTM D5185m >10 0 <1 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Manganese ppm ASTM D5185m 7 <1 12 1 Manganesium ppm ASTM D5185m 0 <1 0 0 0 0 Calcium ppm ASTM D5185m 8 <1 4	Aluminum	ppm	ASTM D5185m	>10	0	0	0
Tin ppm ASTM D5185m >10 0 <1	Lead	ppm	ASTM D5185m	>20	0	<1	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 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 7 <1	Copper	ppm	ASTM D5185m	>50	1	1	2
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 7 <1	Tin	ppm	ASTM D5185m	>10	0	<1	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 7 <1 12 Manganese ppm ASTM D5185m 0 <1 0 Magnesium ppm ASTM D5185m 8 <1 4 Phosphorus ppm ASTM D5185m 315 394 353 362 Zinc ppm ASTM D5185m 30 19 18 Sulfur ppm ASTM D5185m 30 19 18 Sulfur ppm ASTM D5185m 20 14 14230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 1 <1 0 Sodium ppm ASTM D5185m >20 </th <th>Vanadium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th>0</th> <th>0</th>	Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 0 0 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 7 <1	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 7 <1 12 Manganese ppm ASTM D5185m <1 1 1 Magnesium ppm ASTM D5185m 0 <1 0 Calcium ppm ASTM D5185m 8 <1 4 Phosphorus ppm ASTM D5185m 30 19 18 Sulfur ppm ASTM D5185m >50 1 <1 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 1 <1 0 Sodium ppm ASTM D5185m >20 <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 7 <1	Boron	ppm	ASTM D5185m		0	0	0
Manganese ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 0 <1	Molybdenum	ppm	ASTM D5185m		7	<1	12
Calcium ppm ASTM D5185m 8 <1	Manganese	ppm	ASTM D5185m		<1	1	1
Phosphorus ppm ASTM D5185m 315 394 353 362 Zinc ppm ASTM D5185m 30 19 18 Sulfur ppm ASTM D5185m 14295 13141 14230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 1 <1 0 Sodium ppm ASTM D5185m >20 0 <1 0 Potassium ppm ASTM D5185m >20 0 1 0 Water % ASTM D5185m >20 0 1 0 Water % ASTM D5185m >20 0 1 0 Water % ASTM D5185m >20 0 1 0 Particles >4µm ASTM D6304 >50.0 111.5 93.8 147.1 FLUID CLEANLINESS method limit/base current history1 histor	Magnesium	ppm	ASTM D5185m		0	<1	0
Zinc ppm ASTM D5185m 30 19 18 Sulfur ppm ASTM D5185m 14295 13141 14230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 1 <1 0 Sodium ppm ASTM D5185m >20 0 <1 0 Potassium ppm ASTM D5185m >20 0 1 0 Water % ASTM D5185m >20 0 1 0 Particles >4µm ASTM D6304 >50.05 0 ASTM D7647 >80	Calcium	ppm	ASTM D5185m		8	<1	4
Sulfur ppm ASTM D5185m 14295 13141 14230 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 1 <1 0 Sodium ppm ASTM D5185m >20 0 <1 0 Potassium ppm ASTM D5185m >20 0 1 0 Water % ASTM D6304 >0.05 0.011 0.009 0.014 ppm Water ppm ASTM D6304 >500 111.5 93.8 147.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >2500 67257 2098 Particles >6μm ASTM D7647 >2500 Δ 8864 303 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >4 <t< th=""><th>Phosphorus</th><th>ppm</th><th>ASTM D5185m</th><th>315</th><th>394</th><th>353</th><th>362</th></t<>	Phosphorus	ppm	ASTM D5185m	315	394	353	362
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 1 <1 0 Sodium ppm ASTM D5185m >20 0 <1 0 Potassium ppm ASTM D6304 >0.05 0.011 0.009 0.014 ppm Water ppm ASTM D6304 >500 111.5 93.8 147.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 67257 2098 Particles >6μm ASTM D7647 >2500 Δ864 303 Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ23/20/13	Zinc	ppm	ASTM D5185m		30	19	18
Silicon ppm ASTM D5185m >50 1 <1	Sulfur	ppm	ASTM D5185m		14295	13141	14230
Sodium ppm ASTM D5185m >20 0 <1	CONTAMINANTS	;	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 1 0 Water % ASTM D6304 >0.05 0.011 0.009 0.014 ppm Water ppm ASTM D6304 >500 111.5 93.8 147.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 67257 2098 Particles >6μm ASTM D7647 >2500 8864 303 Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ23/20/13 18/15/11	Silicon	ppm	ASTM D5185m	>50	1	<1	0
Water % ASTM D6304 > 0.05 0.011 0.009 0.014 ppm Water ppm ASTM D6304 > 500 111.5 93.8 147.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 67257 2098 Particles >6μm ASTM D7647 > 2500 Δ8864 303 Particles >14μm ASTM D7647 > 320 51 18 Particles >21μm ASTM D7647 > 80 8 6 Particles >38μm ASTM D7647 > 20 0 0 Particles >71μm ASTM D7647 > 4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ23/20/13 18/15/11	Sodium	ppm	ASTM D5185m	>20	0	<1	0
ppm Water ppm ASTM D6304 >500 111.5 93.8 147.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 67257 2098 Particles >6μm ASTM D7647 >2500 Δ8864 303 Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ23/20/13 18/15/11	Potassium	ppm	ASTM D5185m	>20	0	1	0
FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 67257 2098 Particles >6μm ASTM D7647 >2500 № 8864 303 Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ 23/20/13 18/15/11	Water	%	ASTM D6304	>0.05	0.011	0.009	0.014
Particles >4μm ASTM D7647 67257 2098 Particles >6μm ASTM D7647 >2500 \blacktriangle 8864 303 Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ 23/20/13 18/15/11	ppm Water	ppm	ASTM D6304	>500	111.5	93.8	147.1
Particles >6μm ASTM D7647 >2500 № 8864 303 Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ 23/20/13 18/15/11	FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >14μm ASTM D7647 >320 51 18 Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 \triangle 23/20/13 18/15/11	Particles >4µm		ASTM D7647			67257	2098
Particles >21μm ASTM D7647 >80 8 6 Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 \triangle 23/20/13 18/15/11	Particles >6µm		ASTM D7647	>2500		<u>▲</u> 8864	303
Particles >38μm ASTM D7647 >20 0 0 Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 \triangle 23/20/13 18/15/11	Particles >14µm		ASTM D7647	>320		51	18
Particles >71μm ASTM D7647 >4 0 0 Oil Cleanliness ISO 4406 (c) >/18/15 Δ 23/20/13 18/15/11	Particles >21µm		ASTM D7647	>80		8	6
Oil Cleanliness ISO 4406 (c) >/18/15 ▲ 23/20/13 18/15/11	Particles >38µm		ASTM D7647	>20		0	0
	Particles >71µm		ASTM D7647	>4		0	0
FLUID DEGRADATION method limit/base current history1 history2	Oil Cleanliness		ISO 4406 (c)	>/18/15		△ 23/20/13	18/15/11
	FLUID DEGRADA	TION	method	limit/base	current	history1	history2

1.25

1.22



OIL ANALYSIS REPORT







Certificate L2367

Laboratory Sample No. Lab Number

Unique Number

: 05928207 : 10608154

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : NX05928207 : 18 Aug 2023 Diagnosed : 21 Aug 2023

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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