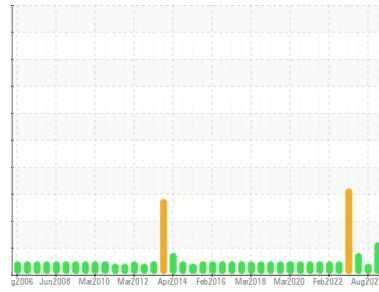




OIL ANALYSIS REPORT

Sample Rating Trend



WEAR



Area
Kingsbridge SP-13584

Machine
T18 (S/N 21764)

Component
Wind Turbine Gearbox

Fluid
MOBIL MOBILGEAR SHC XMP 320 (--- LTR)

DIAGNOSIS

Recommendation

We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

Wear

Copper ppm levels are abnormal. Bearing and/or bushing wear is indicated.

Contamination

The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. NOTE: An increase in the particle count is noted.

Fluid Condition

Phosphorus ppm levels are abnormally low. Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid.

SAMPLE INFORMATION

	method	limit/base	current	history1	history2
Sample Number	Client Info		WC	WC0783150	WC0305862
Sample Date	Client Info		20 Feb 2024	31 Aug 2023	27 Mar 2023
Machine Age	yrs	Client Info	0	0	0
Oil Age	yrs	Client Info	0	0	0
Oil Changed	Client Info		N/A	N/A	N/A
Sample Status			ABNORMAL	ABNORMAL	ABNORMAL

WEAR METALS

	method	limit/base	current	history1	history2	
PQ	ASTM D8184*	>50	0	0	0	
Iron	ppm	ASTM D5185(m)	>75	14	16	24
Chromium	ppm	ASTM D5185(m)	>5	0	0	0
Nickel	ppm	ASTM D5185(m)	>10	0	<1	0
Titanium	ppm	ASTM D5185(m)	>10	0	0	0
Silver	ppm	ASTM D5185(m)		0	<1	0
Aluminum	ppm	ASTM D5185(m)	>10	0	0	0
Lead	ppm	ASTM D5185(m)	>3	0	<1	0
Copper	ppm	ASTM D5185(m)	>5	▲ 9	5	▲ 6
Tin	ppm	ASTM D5185(m)	>3	0	0	0
Antimony	ppm	ASTM D5185(m)	>3	0	0	0
Vanadium	ppm	ASTM D5185(m)		0	0	0
Beryllium	ppm	ASTM D5185(m)		0	0	0
Cadmium	ppm	ASTM D5185(m)		0	0	0

ADDITIVES

	method	limit/base	current	history1	history2	
Boron	ppm	ASTM D5185(m)	0	<1	<1	<1
Barium	ppm	ASTM D5185(m)		0	<1	0
Molybdenum	ppm	ASTM D5185(m)	0	0	0	0
Manganese	ppm	ASTM D5185(m)		0	0	<1
Magnesium	ppm	ASTM D5185(m)		0	0	0
Calcium	ppm	ASTM D5185(m)	0	0	<1	0
Phosphorus	ppm	ASTM D5185(m)	485	▲ 266	▲ 289	349
Zinc	ppm	ASTM D5185(m)	0	16	12	28
Sulfur	ppm	ASTM D5185(m)		3386	3365	3732
Lithium	ppm	ASTM D5185(m)		<1	<1	<1

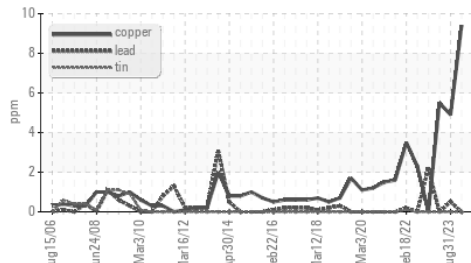
CONTAMINANTS

	method	limit/base	current	history1	history2	
Silicon	ppm	ASTM D5185(m)	>40	4	5	7
Sodium	ppm	ASTM D5185(m)	>10	<1	<1	<1
Potassium	ppm	ASTM D5185(m)	>20	0	0	0
Water	%	ASTM D6304*	>0.02	0.005	0.007	0.006
ppm Water	ppm	ASTM D6304*	>200	55	77	60.7

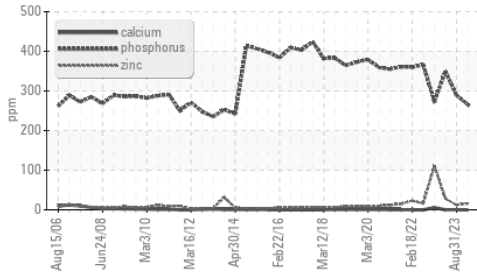
INFRA-RED

	method	limit/base	current	history1	history2	
Soot %	%	ASTM D7844*		0	0	0
Nitration	Abs/cm	ASTM D7624*		2.2	2.1	2.5
Sulfation	Abs/.1mm	ASTM D7415*		48.3	48.1	34.2

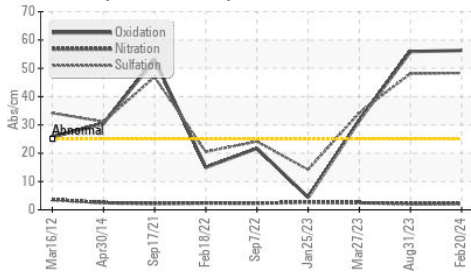
▲ Non-ferrous Metals



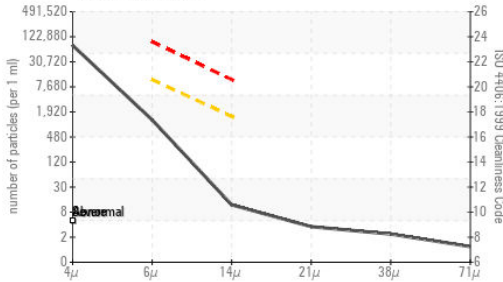
▲ Additives



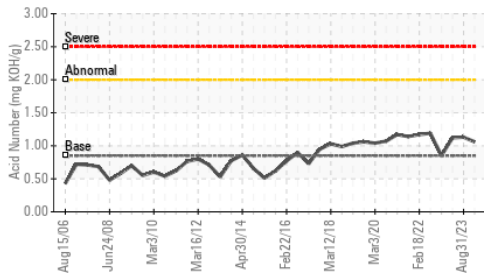
FT-IR (Direct Trend)



Particle Count



Acid Number



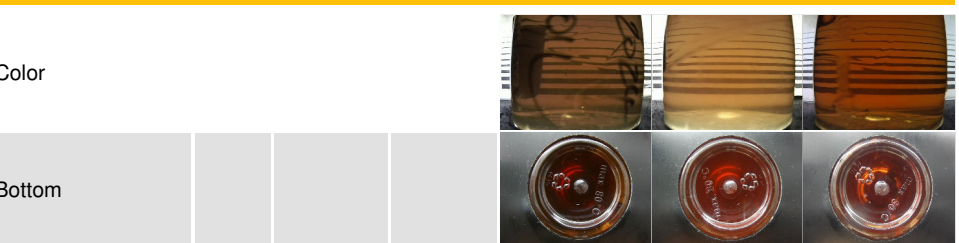
FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		65928	5375	3037
Particles >6µm	ASTM D7647	>10000	1083	102	597
Particles >14µm	ASTM D7647	>1300	10	8	44
Particles >21µm	ASTM D7647	>320	3	3	14
Particles >38µm	ASTM D7647	>80	2	2	2
Particles >71µm	ASTM D7647	>20	1	1	1
Oil Cleanliness	ISO 4406 (c)	>--/20/17	23/17/10	20/14/10	19/16/13

FLUID DEGRADATION	method	limit/base	current	history1	history2
Oxidation	Abs./1mm	ASTM D7414*	56.3	55.9	31.6
Acid Number (AN)	mg KOH/g	ASTM D974*	1.06	1.13	1.12

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

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	327	326	328
Visc @ 100°C	cSt	ASTM D7279(m)	36.4	36.7	36.5
Viscosity Index (VI)	Scale	ASTM D2270*	158	160	158

SAMPLE IMAGES



Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 **Vestas American Wind Technology Inc.**
Sample No. : WC **Received** : 15 Apr 2024 1417 NW Everett Street
Lab Number : 02628993 **Tested** : 17 Apr 2024 Portland, OR
Unique Number : 5762125 **Diagnosed** : 17 Apr 2024 - Kevin Marson US 97209
Test Package : IND 2 (Additional Tests: FT-IR, KF, KV100, PQ, PrtCount, TAN Man, VI) **Contact:** Nicole Philippi
NiPhi@vestas.com
T: (503)327-7683
F: (503)327-0247

To discuss this sample report, contact Customer Service at 1-800-268-2131.
 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
 Validity of results and interpretation are based on the sample and information as supplied.