



OIL ANALYSIS REPORT

WEAR	SEVERE
CONTAMINATION	NORMAL
FLUID CONDITION	ABNORMAL

Area
Ferndale Phase II SP-13598
 Machine Id
T1 V80
 Component
Wind Turbine Gearbox
 Fluid
MOBIL MOBILGEAR SHC XMP 320 (--- GAL)

RECOMMENDATION

We recommend that you drain the oil from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0863468	WC0783088	WC0305896
Sample Date		Client Info		07 Dec 2023	13 Apr 2023	25 Oct 2022
Machine Age	hrs	Client Info		0	0	0
Oil Age	hrs	Client Info		0	0	0
Filter Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Filter Changed		Client Info		N/A	N/A	N/A
Sample Status				SEVERE	SEVERE	ABNORMAL

WEAR

Iron ppm levels are severe. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion.

PQ		ASTM D8184*	>50	0	0	0
Iron	ppm	ASTM D5185(m)	>75	104	109	78
Chromium	ppm	ASTM D5185(m)	>5	1	1	<1
Nickel	ppm	ASTM D5185(m)	>10	0	<1	<1
Titanium	ppm	ASTM D5185(m)	>10	0	0	0
Silver	ppm	ASTM D5185(m)		0	0	0
Aluminum	ppm	ASTM D5185(m)	>10	<1	<1	0
Lead	ppm	ASTM D5185(m)	>15	<1	<1	0
Copper	ppm	ASTM D5185(m)	>5	<1	<1	2
Tin	ppm	ASTM D5185(m)	>10	0	0	0
Vanadium	ppm	ASTM D5185(m)		0	0	0
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE

CONTAMINATION

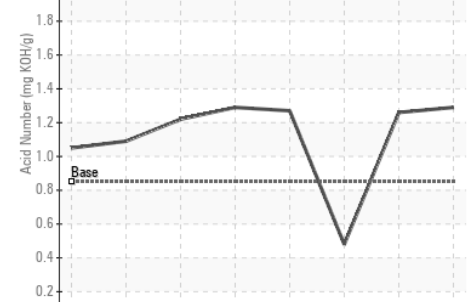
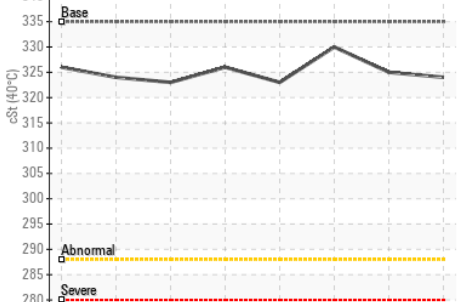
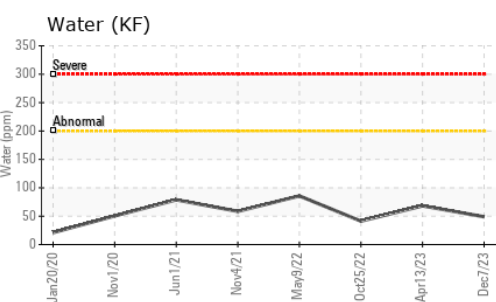
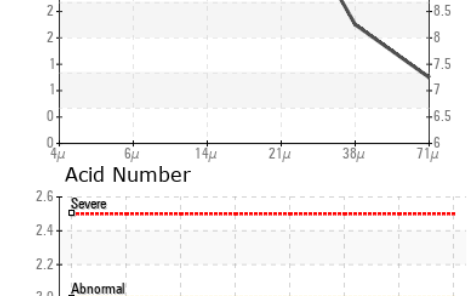
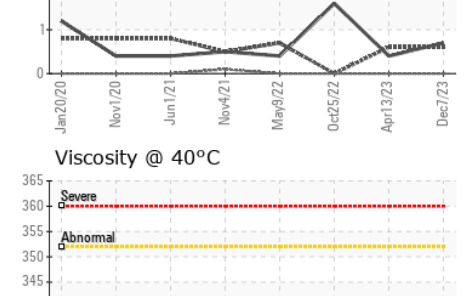
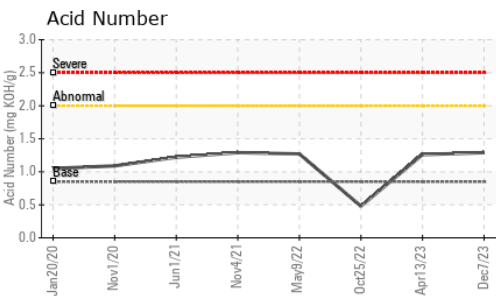
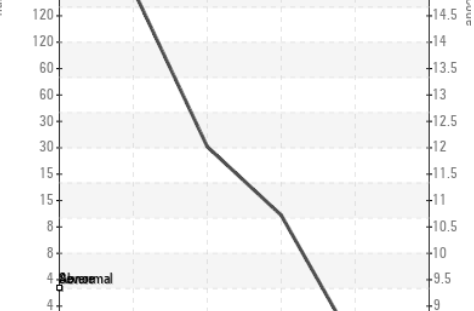
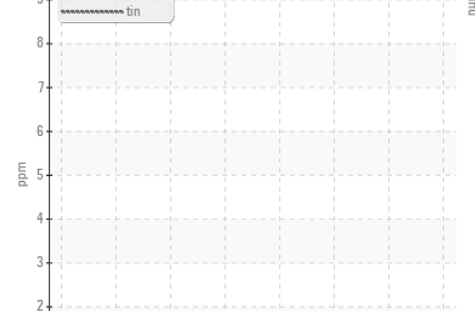
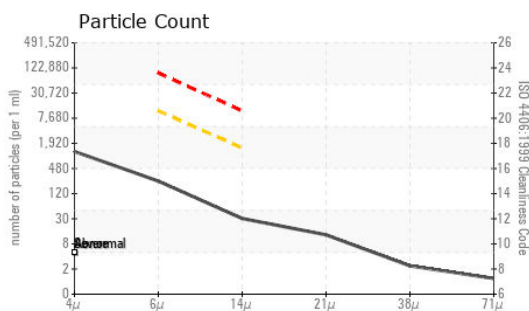
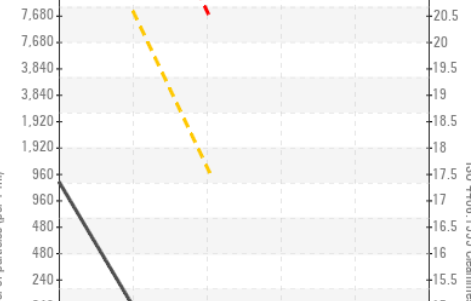
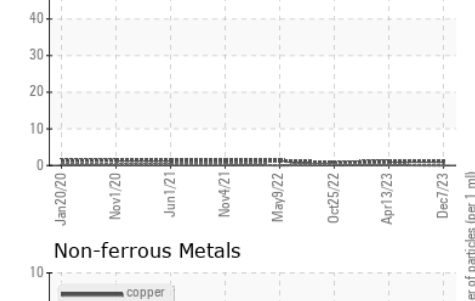
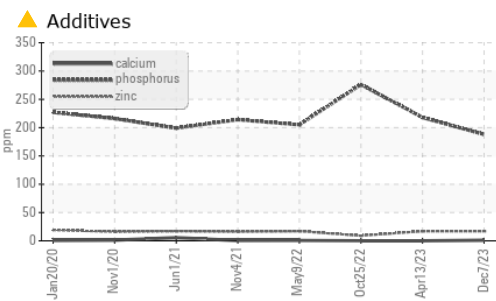
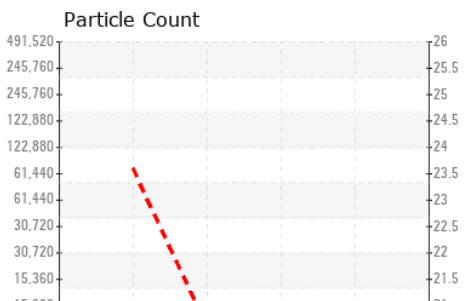
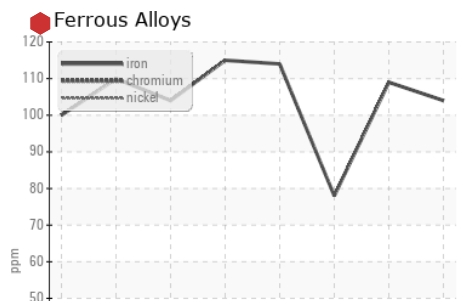
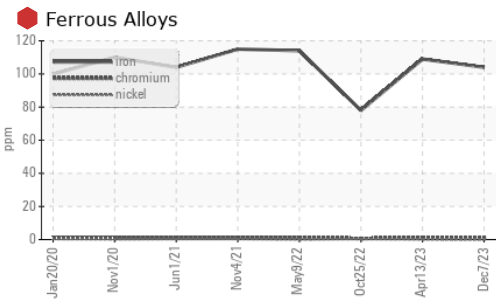
The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable.

Silicon	ppm	ASTM D5185(m)	>40	1	2	2
Potassium	ppm	ASTM D5185(m)	>20	1	<1	<1
Water	%	ASTM D6304*	>0.02	0.004	0.006	0.004
ppm Water	ppm	ASTM D6304*	>200	49	68.2	41.3
Soot %	%	ASTM D7844*		0	0	0
Nitration	Abs/cm	ASTM D7624*		2.0	1.9	2.4
Sulfation	Abs/.1mm	ASTM D7415*		27.5	27.8	22.3
Particles >4µm		ASTM D7647		1073	3728	1929
Particles >6µm		ASTM D7647	>10000	211	1027	397
Particles >14µm		ASTM D7647	>1300	27	67	21
Particles >21µm		ASTM D7647	>320	11	12	6
Particles >38µm		ASTM D7647	>80	2	0	1
Particles >71µm		ASTM D7647	>20	1	0	0
Oil Cleanliness		ISO 4406 (c)	---/20/17	17/15/12	19/17/13	18/16/12
Silt	scalar	Visual*	NONE	NONE	NONE	NONE
Debris	scalar	Visual*	NONE	NONE	NONE	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*	>0.02	NEG	NEG	NEG

FLUID CONDITION

Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

Sodium	ppm	ASTM D5185(m)	>10	6	7	<1
Boron	ppm	ASTM D5185(m)	0	<1	1	<1
Barium	ppm	ASTM D5185(m)		0	0	0
Molybdenum	ppm	ASTM D5185(m)	0	1	2	0
Manganese	ppm	ASTM D5185(m)		<1	1	<1
Magnesium	ppm	ASTM D5185(m)		<1	0	0
Calcium	ppm	ASTM D5185(m)	0	1	0	0
Phosphorus	ppm	ASTM D5185(m)	485	188	218	276
Zinc	ppm	ASTM D5185(m)	0	17	17	9
Sulfur	ppm	ASTM D5185(m)		6692	6865	3219
Oxidation	Abs/.1mm	ASTM D7414*		29.1	29.1	17.8
Acid Number (AN)	mg KOH/g	ASTM D974*	0.85	1.29	1.26	0.48
Visc @ 40°C	cSt	ASTM D7279(m)	335	324	325	330
Visc @ 100°C	cSt	ASTM D7279(m)	38.3	35.2	35.4	37.3
Viscosity Index (VI)	Scale	ASTM D2270*	164	154	154	161



Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Vestas American Wind Technology Inc.
Sample No. : WC0863468 **Received** : 12 Jan 2024 1417 NW Everett Street
Lab Number : 02608640 **Diagnosed** : 16 Jan 2024 Portland, OR
Unique Number : 5709726 **Diagnostician** : Kevin Marson US 97209
Test Package : IND 2 (Additional Tests: FT-IR, KF, KV100, PQ, PrtCount, TAN Man, VI) **Contact:** Nicole Philippi
 To discuss this sample report, contact Customer Service at 1-800-268-2131. NiPhi@vestas.com
 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. T: (503)327-7683
 Validity of results and interpretation are based on the sample and information as supplied. F: (503)327-0247