



# OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Area  
**Kingsbridge SP-13584**

Machine Id  
**T21 (S/N 21750)**

Component  
**Wind Turbine Gearbox**

Fluid  
**CHEVRON PINNACLE WM 320 (--- LTR)**

## RECOMMENDATION

Resample at the next service interval to monitor. 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		<b>WC0863452</b>	WC0783094	WC0305836
Sample Date		Client Info		<b>21 Dec 2023</b>	02 Aug 2023	12 Sep 2022
Machine Age	yrs	Client Info		<b>0</b>	0	0
Oil Age	yrs	Client Info		<b>0</b>	0	0
Filter Age	yrs	Client Info		<b>0</b>	0	0
Oil Changed		Client Info		<b>N/A</b>	N/A	N/A
Filter Changed		Client Info		<b>N/A</b>	N/A	N/A
Sample Status				<b>NORMAL</b>	SEVERE	SEVERE

## WEAR

All component wear rates are normal.

PQ		ASTM D8184*	>50	<b>0</b>	0	0
Iron	ppm	ASTM D5185(m)	>75	<b>0</b>	▲ 78	74
Chromium	ppm	ASTM D5185(m)	>5	<b>0</b>	<1	<1
Nickel	ppm	ASTM D5185(m)	>10	<b>0</b>	0	<1
Titanium	ppm	ASTM D5185(m)	>10	<b>0</b>	0	0
Silver	ppm	ASTM D5185(m)		<b>0</b>	0	0
Aluminum	ppm	ASTM D5185(m)	>10	<b>&lt;1</b>	<1	<1
Lead	ppm	ASTM D5185(m)	>15	<b>0</b>	<1	<1
Copper	ppm	ASTM D5185(m)	>10	<b>0</b>	2	1
Tin	ppm	ASTM D5185(m)	>10	<b>0</b>	0	<1
Vanadium	ppm	ASTM D5185(m)		<b>0</b>	0	0
White Metal	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Yellow Metal	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE

## CONTAMINATION

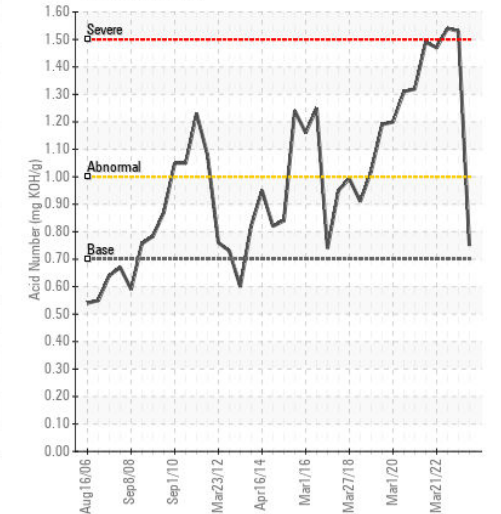
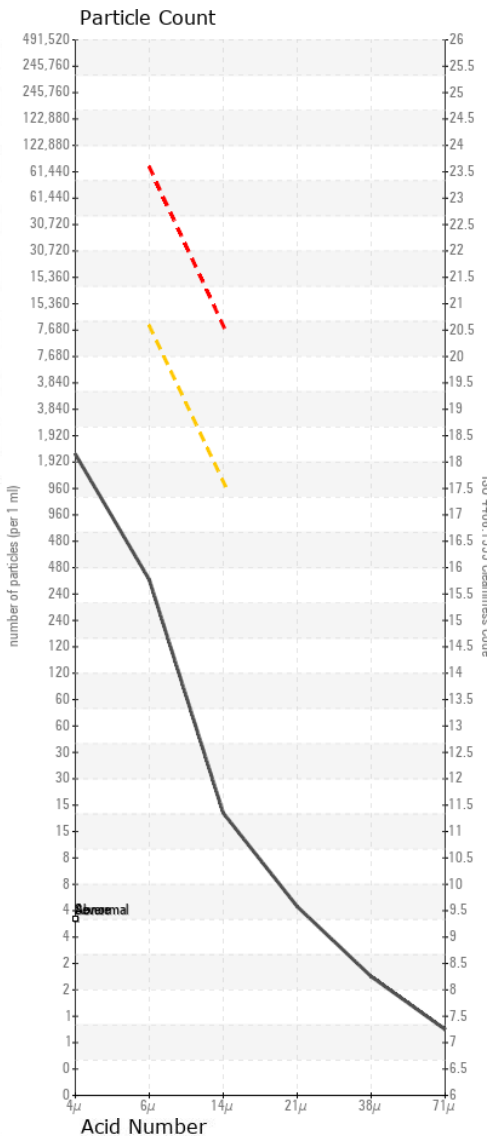
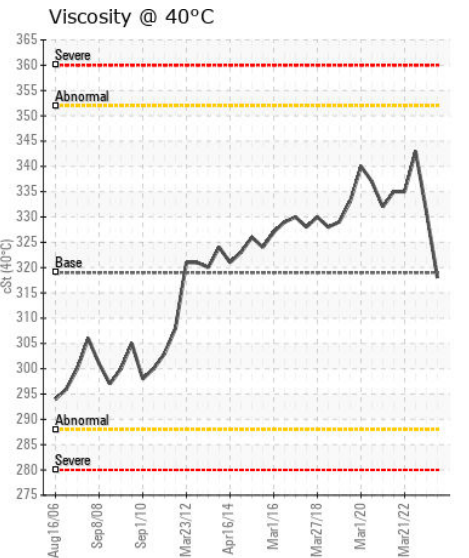
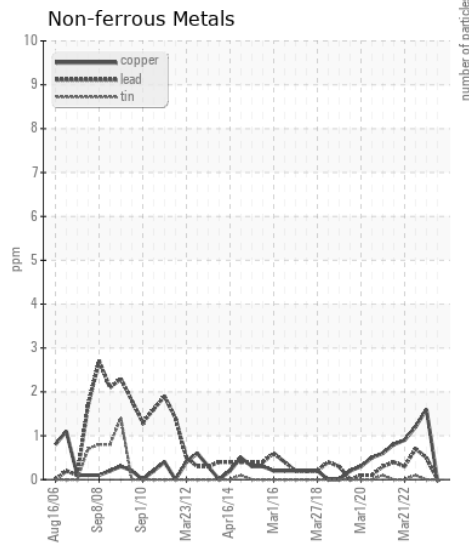
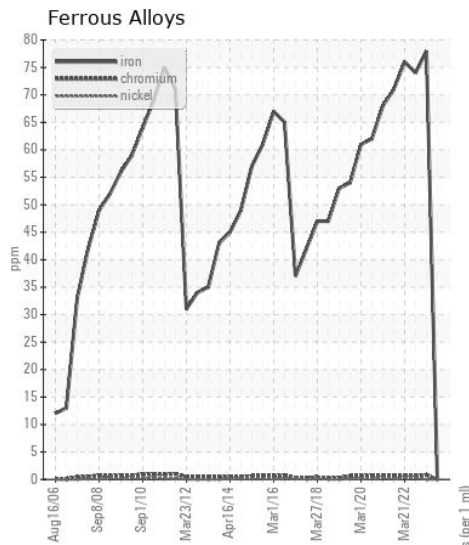
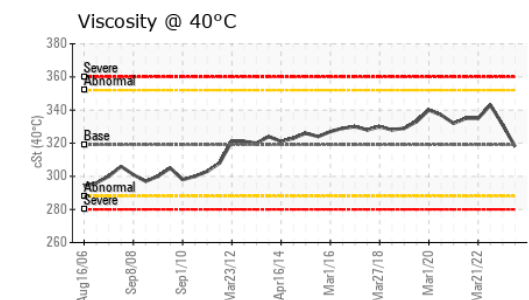
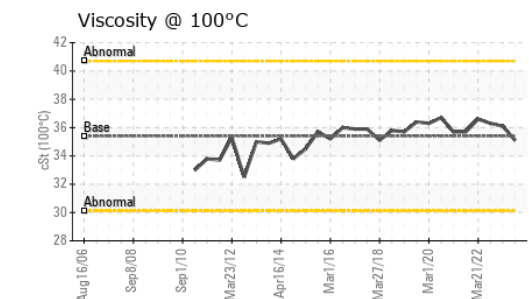
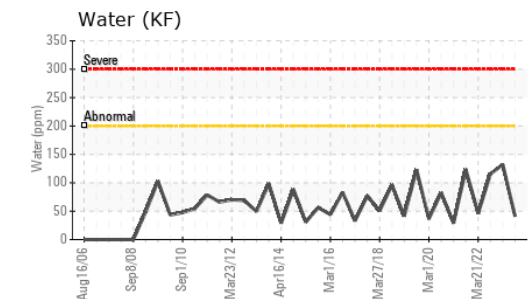
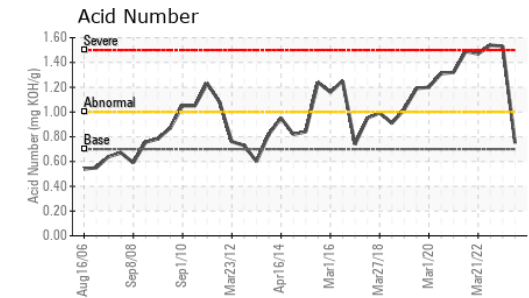
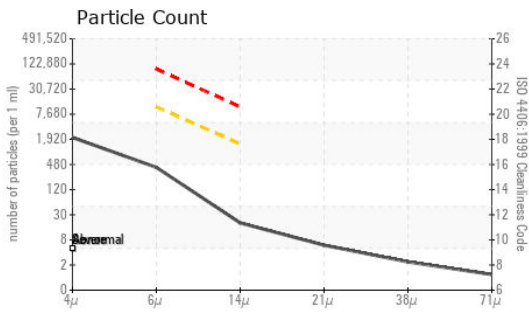
The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable.

Silicon	ppm	ASTM D5185(m)	>10	<b>0</b>	<1	<1
Potassium	ppm	ASTM D5185(m)	>20	<b>&lt;1</b>	<1	1
Water	%	ASTM D6304*	>0.02	<b>0.004</b>	0.013	0.011
ppm Water	ppm	ASTM D6304*	>200	<b>41</b>	131.9	115.7
Soot %	%	ASTM D7844*		<b>0</b>	0	0
Nitration	Abs/cm	ASTM D7624*		<b>1.9</b>	2.2	2.1
Sulfation	Abs/.1mm	ASTM D7415*		<b>27.7</b>	28.3	27.6
Particles >4µm		ASTM D7647		<b>1863</b>	1182	191
Particles >6µm		ASTM D7647	>10000	<b>360</b>	281	50
Particles >14µm		ASTM D7647	>1300	<b>17</b>	23	9
Particles >21µm		ASTM D7647	>320	<b>5</b>	8	2
Particles >38µm		ASTM D7647	>80	<b>2</b>	1	0
Particles >71µm		ASTM D7647	>20	<b>1</b>	0	0
Oil Cleanliness		ISO 4406 (c)	>-/20/17	<b>18/16/11</b>	17/15/12	15/13/10
Silt	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Debris	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Sand/Dirt	scalar	Visual*	NONE	<b>NONE</b>	NONE	NONE
Appearance	scalar	Visual*	NORML	<b>NORML</b>	NORML	NORML
Odor	scalar	Visual*	NORML	<b>NORML</b>	NORML	NORML
Emulsified Water	scalar	Visual*	>0.02	<b>NEG</b>	NEG	NEG

## FLUID CONDITION

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

Sodium	ppm	ASTM D5185(m)	>10	<b>0</b>	6	6
Boron	ppm	ASTM D5185(m)	0	<b>&lt;1</b>	1	1
Barium	ppm	ASTM D5185(m)	0	<b>0</b>	0	0
Molybdenum	ppm	ASTM D5185(m)	0	<b>0</b>	0	0
Manganese	ppm	ASTM D5185(m)		<b>0</b>	<1	<1
Magnesium	ppm	ASTM D5185(m)	0	<b>&lt;1</b>	<1	0
Calcium	ppm	ASTM D5185(m)	0	<b>2</b>	1	<1
Phosphorus	ppm	ASTM D5185(m)	300	<b>270</b>	232	240
Zinc	ppm	ASTM D5185(m)	0	<b>&lt;1</b>	▲ 25	▲ 21
Sulfur	ppm	ASTM D5185(m)	8000	<b>7363</b>	7063	7182
Oxidation	Abs/.1mm	ASTM D7414*		<b>27.5</b>	29.1	29.6
Acid Number (AN)	mg KOH/g	ASTM D974*	0.7	<b>0.75</b>	▲ 1.53	▲ 1.54
Visc @ 40°C	cSt	ASTM D7279(m)	319	<b>318</b>	331	343
Visc @ 100°C	cSt	ASTM D7279(m)	35.4	<b>35.1</b>	36.1	36.3
Viscosity Index (VI)	Scale	ASTM D2270*	156	<b>155</b>	155	152



ISO 17025:2017  
Accredited  
Laboratory

**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Vestas American Wind Technology Inc.  
**Sample No.** : WC0863452 **Received** : 12 Jan 2024 1417 NW Everett Street  
**Lab Number** : 02608645 **Diagnosed** : 16 Jan 2024 Portland, OR  
**Unique Number** : 5709731 **Diagnostician** : 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

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.

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