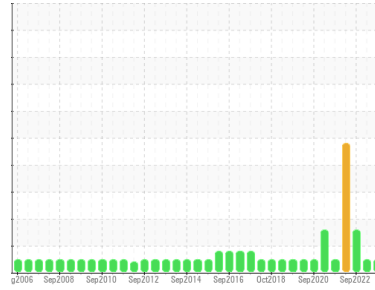




# OIL ANALYSIS REPORT

Sample Rating Trend



**NORMAL**



Area  
**Kingsbridge SP-13584**

Machine Id  
**T14**

Component  
**Wind Turbine Gearbox**

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

## DIAGNOSIS

### Recommendation

Resample at the next service interval to monitor.  
NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

### Wear

All component wear rates are normal.

### 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.

### Fluid Condition

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

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number	Client Info			<b>WC0783090</b>	WC0783072	WC0305823
Sample Date	Client Info			<b>18 Jul 2023</b>	11 Apr 2023	28 Sep 2022
Machine Age	yrs	Client Info		<b>0</b>	0	0
Oil Age	yrs	Client Info		<b>0</b>	0	0
Oil Changed	Client Info			<b>N/A</b>	N/A	N/A
Sample Status				<b>NORMAL</b>	NORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*	>50	<b>0</b>	0	0
Iron	ppm	ASTM D5185(m)	>75	<b>72</b>	68	58
Chromium	ppm	ASTM D5185(m)	>5	<b>&lt;1</b>	<1	<1
Nickel	ppm	ASTM D5185(m)	>10	<b>&lt;1</b>	<1	<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>1</b>	2	1
Copper	ppm	ASTM D5185(m)	>10	<b>&lt;1</b>	<1	<1
Tin	ppm	ASTM D5185(m)	>10	<b>0</b>	0	0
Antimony	ppm	ASTM D5185(m)	>5	<b>0</b>	0	<1
Vanadium	ppm	ASTM D5185(m)		<b>0</b>	0	0
Beryllium	ppm	ASTM D5185(m)		<b>0</b>	0	0
Cadmium	ppm	ASTM D5185(m)		<b>0</b>	0	0

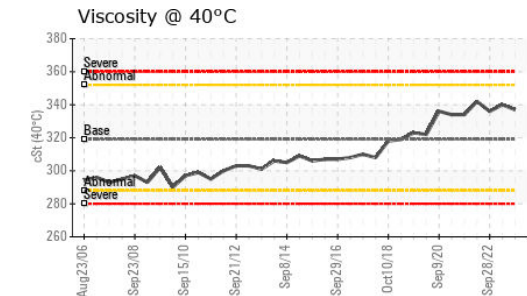
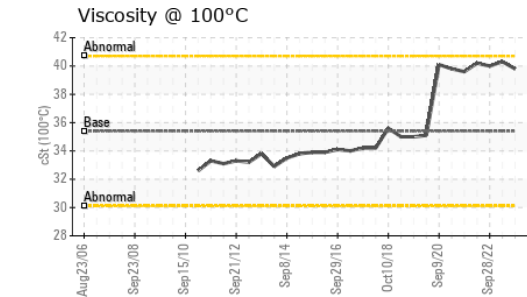
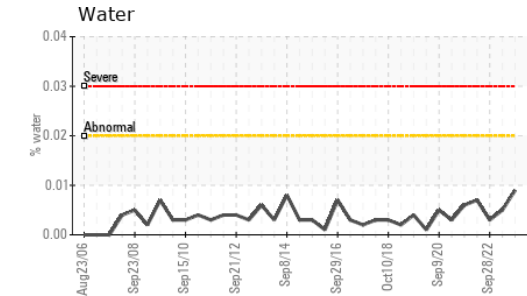
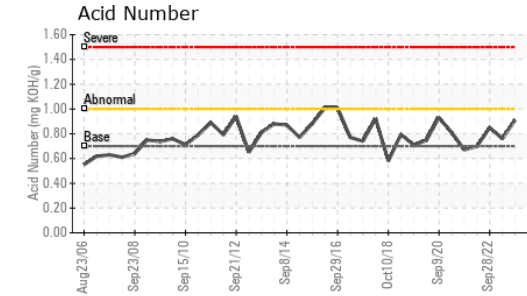
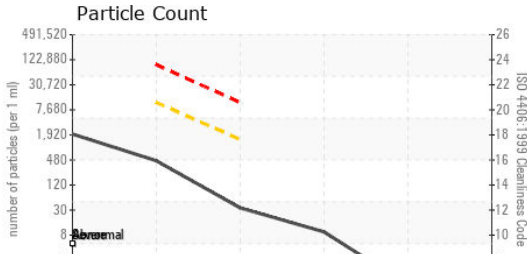
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	0	<b>1</b>	<1	<1
Barium	ppm	ASTM D5185(m)	0	<b>&lt;1</b>	<1	<1
Molybdenum	ppm	ASTM D5185(m)	0	<b>0</b>	0	0
Manganese	ppm	ASTM D5185(m)		<b>2</b>	2	2
Magnesium	ppm	ASTM D5185(m)	0	<b>&lt;1</b>	<1	0
Calcium	ppm	ASTM D5185(m)	0	<b>6</b>	4	6
Phosphorus	ppm	ASTM D5185(m)	300	<b>319</b>	326	329
Zinc	ppm	ASTM D5185(m)	0	<b>15</b>	13	11
Sulfur	ppm	ASTM D5185(m)	8000	<b>4930</b>	4985	4972
Lithium	ppm	ASTM D5185(m)		<b>&lt;1</b>	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>10	<b>4</b>	7	▲ 15
Sodium	ppm	ASTM D5185(m)	>10	<b>6</b>	6	5
Potassium	ppm	ASTM D5185(m)	>20	<b>1</b>	<1	<1
Water	%	ASTM D6304*	>0.02	<b>0.009</b>	0.005	0.003
ppm Water	ppm	ASTM D6304*	>200	<b>97.3</b>	51.5	31.9

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	ASTM D7844*		<b>0</b>	0	0
Nitration	Abs/cm	ASTM D7624*		<b>3.0</b>	2.8	3.1
Sulfation	Abs/.1mm	ASTM D7415*		<b>12.6</b>	11.9	12.3



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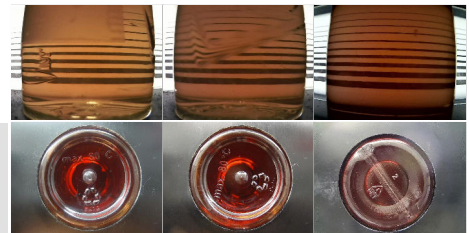
FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647		<b>1760</b>	1480	3104
Particles >6µm	ASTM D7647	>10000	<b>405</b>	309	1085
Particles >14µm	ASTM D7647	>1300	<b>30</b>	16	138
Particles >21µm	ASTM D7647	>320	<b>8</b>	5	50
Particles >38µm	ASTM D7647	>80	<b>0</b>	3	6
Particles >71µm	ASTM D7647	>20	<b>0</b>	3	1
Oil Cleanliness	ISO 4406 (c)	>--/20/17	<b>18/16/12</b>	18/15/11	19/17/14

FLUID DEGRADATION	method	limit/base	current	history1	history2
Oxidation	Abs./1mm	ASTM D7414*	<b>6.5</b>	6.4	7.1
Acid Number (AN)	mg KOH/g	ASTM D974*	<b>0.91</b>	0.76	0.85

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

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	<b>337</b>	340	336
Visc @ 100°C	cSt	ASTM D7279(m)	<b>39.8</b>	40.3	40.0
Viscosity Index (VI)	Scale	ASTM D2270*	<b>170</b>	171	171

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					



**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Vestas American Wind Technology Inc.  
**Sample No.** : WC0783090 **Received** : 18 Aug 2023 1417 NW Everett Street  
**Lab Number** : **02576920** **Diagnosed** : 21 Aug 2023 Portland, OR  
**Unique Number** : 5629980 **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