

Unit ID **Wind energy system 1**
 Component **Main Gear**
 Current sample number **1704304**



OELCHECK GmbH · Kerschelweg 28 · 83098 Brannenburg

Example report
 Analysis scope: Wind power analysis kit

Machine type: **FL1000**
 Manufacturer: **Zollern PZ3WF112**
 Sample from: **Wind turbine - main gear**
 Oil brand name: **Mobil Mobilgear SHC XMP 320**
 Oil quantity in system: **260 l**

Serial number: 25107

Diagnosis for the current laboratory values

There is no significant change of wear metals since the previous sample. The cleanliness class of the oil complies with the requirements. The water content is within the normal range. If no oil change has happened yet, it is possible to continue using the oil under similar operating conditions and under continuation of the usual maintenance schedule. I recommend that you send the next sample at the next service interval or at your regular inspection for trend analysis.

Dipl.-Ing. Andy Böhme (CLS)

Sample Rating



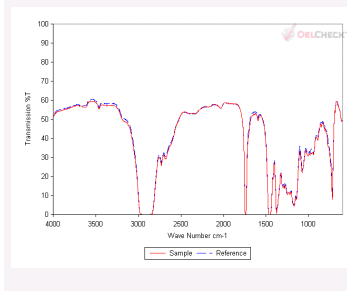
normal

ANALYSIS RESULTS			Current sample	2 previous samples not shown		
LAB NUMBER			1704304	1704305	1704306	1704307
SAMPLE RATING			✓	✓	✓	✓
Date tested			08.06.2022	23.12.2021	01.07.2021	23.12.2020
Date of sample taken			29.05.2022	14.12.2021	21.06.2021	08.12.2020
Date of last oil change			-	-	-	-
Top-up since change	l		-	-	10	0
Operating time since change			-	-	-	-
Total operating time	h		138011	134075	129920	125235
Oil changed			no	no	no	no
WEAR						
Iron	Fe	mg/kg	54	55	53	48
Chrom	Cr	mg/kg	1	1	1	1
Tin	Sn	mg/kg	0	0	0	0
Aluminum	Al	mg/kg	0	0	0	0
Nickel	Ni	mg/kg	0	0	0	0
Copper	Cu	mg/kg	3	0	3	3
Lead	Pb	mg/kg	0	0	0	0
Manganese	Mn	mg/kg	1	1	1	0
PQ index	-		< 25	< 25	< 25	< 25
CONTAMINATION						
Silicon	Si	mg/kg	1	1	1	1
Potassium	K	mg/kg	0	2	0	0
Sodium	Na	mg/kg	0	0	0	0
Water K. F.	ppm		97	68	133	-
Water	%		-	-	-	< 0.10
OIL CONDITION						
Viscosity at 40°C	mm²/s		321.11	320.22	318.66	317.57
Viscosity at 100°C	mm²/s		36.56	36.13	36.58	36.35
Viscosity index	-		162	160	163	162
Oxidation	A/cm		-	-	-	-
IR index	-		99.79	99.78	99.83	99.67
ADDITIVES						
Calcium	Ca	mg/kg	0	0	0	1
Magnesium	Mg	mg/kg	0	0	0	0
Boron	B	mg/kg	1	1	1	1
Zinc	Zn	mg/kg	10	9	11	10
Phosphorus	P	mg/kg	412	445	429	420
Barium	Ba	mg/kg	0	0	0	0
Molybdenum	Mo	mg/kg	2	2	2	2
Sulphur	S	mg/kg	3247	3495	3189	3211

Bottle and cap



Infrared Spectrum



LAB REPORT

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Top-up since change	l	-	-	10	0
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Total operating time	h	138011	134075	129920	125235
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ADDITIONAL TESTS					
AN / NN	mgKOH/g	1.18	1.12	1.02	0.97
Cleanliness class	ISO 4406	17/16/12	17/15/12	16/14/8	18/16/12
A: >4µm = ISO >4µm	Particles/100ml	84766	96494	38537	219604
B: >6µm = ISO >6µm	Particles/100ml	34851	23920	11327	54132
C: >14µm = ISO >14µm	Particles/100ml	3603	2873	200	2251
D: >21µm	Particles/100ml	701	718	0	450
E: >38µm	Particles/100ml	100	308	0	0
F: >70µm	Particles/100ml	0	0	0	0
Cleanliness class	SAE AS 4059	7A	8E	6A	9A



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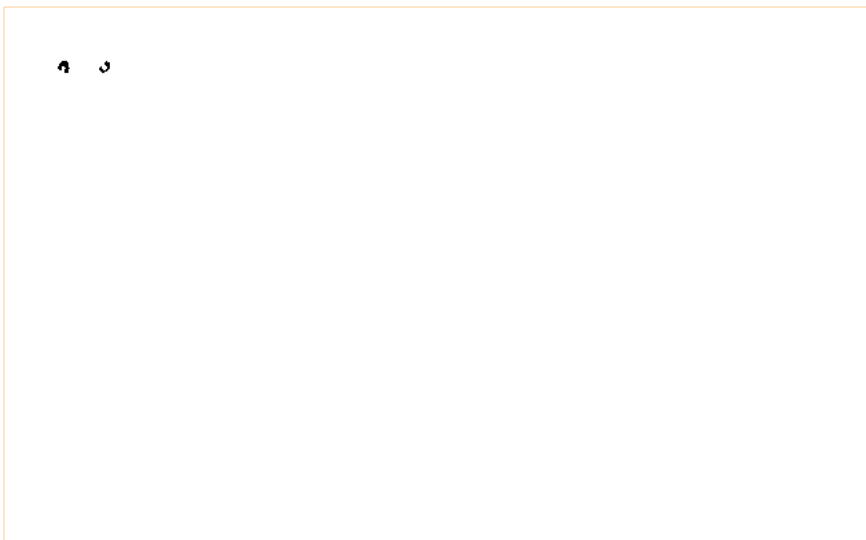
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Diagnosis for the optical particle analysis (OPA)

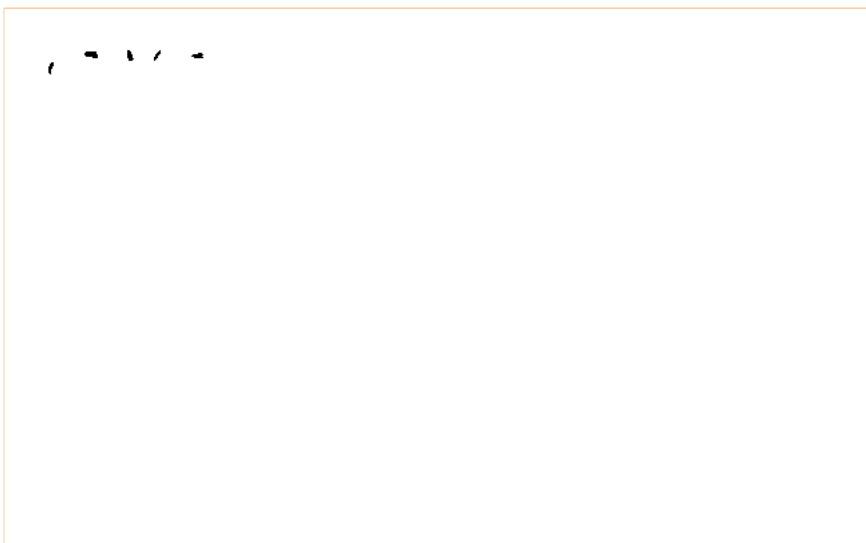
The values for the nonmetallic contaminants and for wear particles are within the normal range.

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Cutting wear

Caused by solid contaminants



Sliding wear

Caused by contact between metal surfaces under high specific load

ANALYSIS RESULTS

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Date tested	08.06.2022
Date of sample taken	29.05.2022
Date of last oil change	-
Top-up since change	l -
Operating time since change	-
Total operating time	h 138011
Oil changed	no

Particles in the current sample

Number of particles $\geq 20 \mu\text{m}$ acc. to OPA	
Relates to 1ml oil	
Cutting wear	< 20
Sliding wear	< 20
Fatigue wear	< 20
Non metallic particles	< 20
Unclassified	< 20

Number of particles acc. to ISO 4406 (1999)	
Relates to 100ml oil	
Cleanliness class ISO 4406	17/16/12
>4 μm	84766
>6 μm	34851
>14 μm	3603
>21 μm	701
>38 μm	100
Cleanliness class SAE AS 4059	7A

The graphs show the countours of the particles $> 20 \mu\text{m}$



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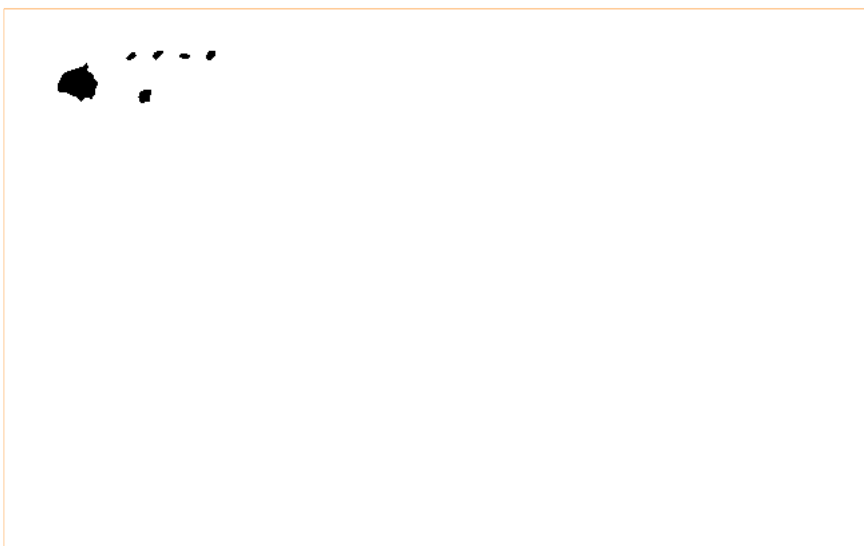


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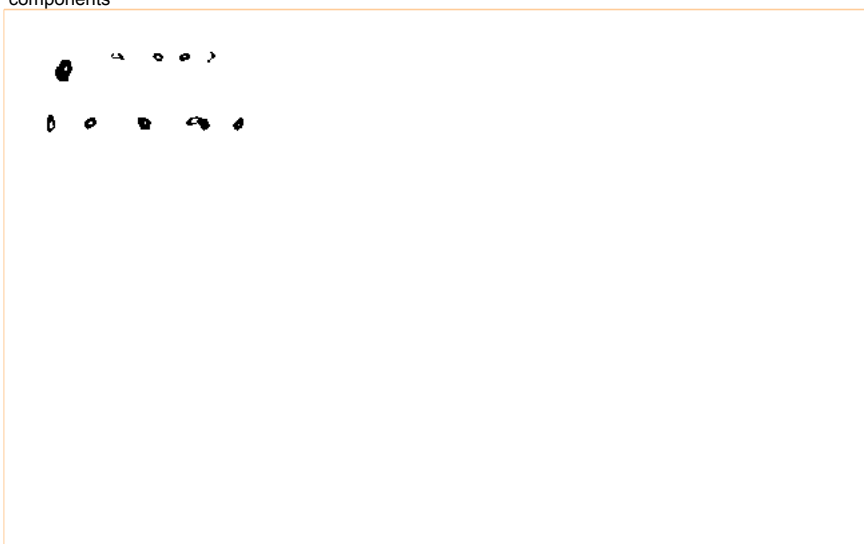


Fatigue wear

Caused by overload, vibration, long term use of components



1 scale line corresponds to 100 µm



Non metallic particles

Typical for additives, tribopolymers, soot, solid contaminants (dust)



1 scale line corresponds to 100 µm

