



# OIL ANALYSIS REPORT

WEAR	<b>ABNORMAL</b>
CONTAMINANTS	<b>ABNORMAL</b>
OIL CONDITION	<b>SEVERE</b>

Area

[RO855403]

Machine Id

BMW 5UXWX5C51BL705450

Component

Front Gasoline Engine

Fluid

GASOLINE ENGINE OIL SAE 5W30 (--- GAL)

## RECOMMENDATION

We understand that this sample is for warranty/insurance purposes. We advise that you check for faulty combustion and a possible overheat condition. We advise that you check the engine tuning and timing. We recommend that you drain the oil from the component if this has not already been done. Diagnostician's Note: The extremely high acid number (AN) and oxidation level and high nitration and sulfation combined with the normal base number (BN) suggests that the oil drain interval was extended, and then the oil was topped up with fresh oil prior to the oil sample.

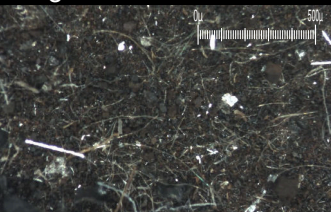
## WEAR

Aluminum ppm levels are abnormal. The filter contained some aluminum cutting wear particles. Piston and/or bearing wear is indicated.

Magn: 10x Illum: RW



Magn: 60x Illum: RW



Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		PP0000063	---	---
Sample Date		Client Info		26 Feb 2024	---	---
Machine Age	kms	Client Info		223861	---	---
Oil Age	kms	Client Info		0	---	---
Filter Age	kms	Client Info		0	---	---
Oil Changed		Client Info		N/A	---	---
Filter Changed		Client Info		N/A	---	---
Sample Status				SEVERE	---	---
Iron	ppm	ASTM D5185(m)	>150	107	---	---
Chromium	ppm	ASTM D5185(m)	>20	2	---	---
Nickel	ppm	ASTM D5185(m)	>5	<1	---	---
Titanium	ppm	ASTM D5185(m)		0	---	---
Silver	ppm	ASTM D5185(m)	>2	0	---	---
Aluminum	ppm	ASTM D5185(m)	>40	54	---	---
Lead	ppm	ASTM D5185(m)	>50	0	---	---
Copper	ppm	ASTM D5185(m)	>155	15	---	---
Tin	ppm	ASTM D5185(m)	>10	9	---	---
Vanadium	ppm	ASTM D5185(m)		0	---	---
White Metal	scalar	Visual*	NONE	NONE	---	---
Yellow Metal	scalar	Visual*	NONE	NONE	---	---
Ferrous Rubbing	Scale 0-10	ASTM D7684*		1		
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*				
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*				
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*				
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*		2		
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*		2		
Nonferrous Rolling	Scale 0-10	ASTM D7684*		1		
Nonferrous Other	Scale 0-10	ASTM D7684*				
Patch Weight	mg	ASTM D7684*		474	---	---

## CONTAMINANTS

There is an abnormal level of nitration indicated. There is an abnormal level of sulfation indicated. There is a trace of moisture present in the oil. Test for glycol is negative.

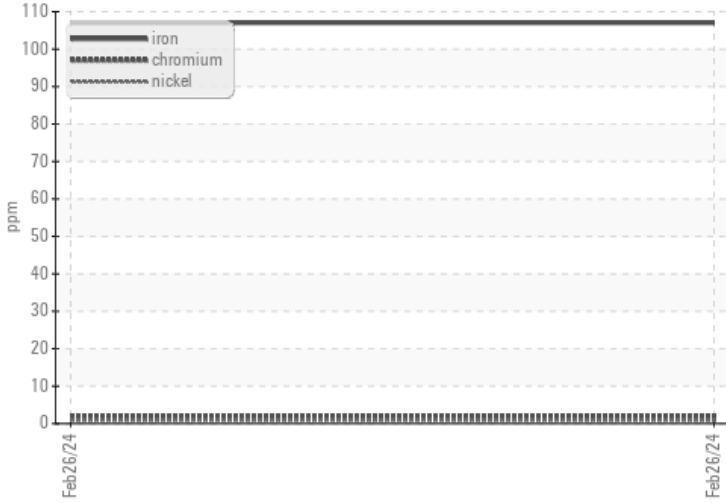
Silicon	ppm	ASTM D5185(m)	>30	<b>23</b>	---	---
Potassium	ppm	ASTM D5185(m)	>20	<b>4</b>	---	---
Fuel		WC Method	>4.0	<b>&lt;1.0</b>	---	---
Water	%	ASTM D6304*	>0.2	<b>▲ 0.195</b>	---	---
ppm Water	ppm	ASTM D6304*	>2000	<b>▲ 1956</b>	---	---
Glycol	%	ASTM D7922*		<b>0.0</b>	---	---
Soot %	%	ASTM D7844*		<b>0</b>	---	---
Nitration	Abs/cm	ASTM D7624*	>20	<b>▲ 29.7</b>	---	---
Sulfation	Abs/.1mm	ASTM D7415*	>30	<b>▲ 39.2</b>	---	---
Silt	scalar	Visual*	NONE	<b>VLITE</b>	---	---
Debris	scalar	Visual*	NONE	<b>NONE</b>	---	---
Sand/Dirt	scalar	Visual*	NONE	<b>VLITE</b>	---	---
Appearance	scalar	Visual*	NORML	<b>NORML</b>	---	---
Odor	scalar	Visual*	NORML	<b>NORML</b>	---	---
Emulsified Water	scalar	Visual*	>0.2	<b>.2%</b>	---	---
Sand/Dirt	Scale 0-10	ASTM D7684*		<b>3</b>		
Fibres	Scale 0-10	ASTM D7684*		<b>2</b>		
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*				

## OIL CONDITION

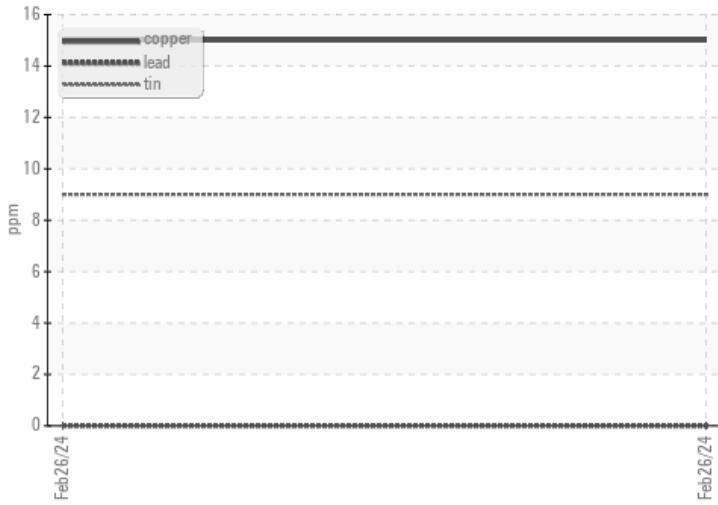
A small degree of oil oxidation was indicated. The oil viscosity is higher than normal. The high AN level of the oil indicates the presence of oxipolymerized products. The AN level is much higher than the recommended limit. The BN result indicates that there is suitable alkalinity remaining in the oil. Viscosity of sample indicates oil is within SAE 5W40 range, advise investigate. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

Sodium	ppm	ASTM D5185(m)	>400	<b>21</b>	---	---
Boron	ppm	ASTM D5185(m)	75	<b>41</b>	---	---
Barium	ppm	ASTM D5185(m)	5	<b>1</b>	---	---
Molybdenum	ppm	ASTM D5185(m)	100	<b>49</b>	---	---
Manganese	ppm	ASTM D5185(m)		<b>6</b>	---	---
Magnesium	ppm	ASTM D5185(m)	12	<b>439</b>	---	---
Calcium	ppm	ASTM D5185(m)	2100	<b>2144</b>	---	---
Phosphorus	ppm	ASTM D5185(m)	650	<b>747</b>	---	---
Zinc	ppm	ASTM D5185(m)	850	<b>935</b>	---	---
Sulfur	ppm	ASTM D5185(m)	2500	<b>1754</b>	---	---
Oxidation	Abs/.1mm	ASTM D7414*	>25	<b>▲ 51.5</b>	---	---
Acid Number (AN)	mg KOH/g	ASTM D974*		<b>▲ 7.54</b>	---	---
Base Number (BN)	mg KOH/g	ASTM D2896*		<b>6.04</b>	---	---
Visc @ 40°C	cSt	ASTM D7279(m)	63	<b>▲ 97.2</b>	---	---
Visc @ 100°C	cSt	ASTM D7279(m)	10.9	<b>▲ 14.8</b>	---	---
Viscosity Index (VI)	Scale	ASTM D2270*	165	<b>159</b>	---	---

### Ferrous Alloys



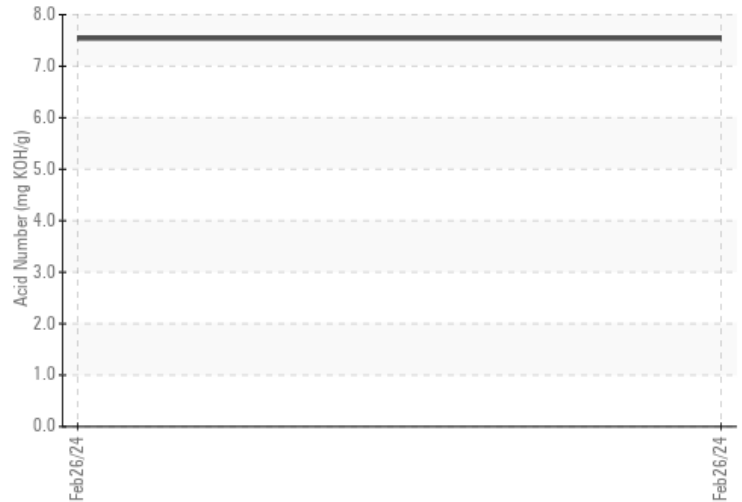
### Non-ferrous Metals



### ▲ Viscosity @ 100°C



### ▲ Acid Number



ISO 17025:2017  
Accredited  
Laboratory

**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9  
**Sample No.** : PP0000063  
**Lab Number** : 02626046  
**Unique Number** : 5759178  
**Test Package** : INS ( Additional Tests: FT-IR, Glycol, KF, TAN Man, VI )  
**Received** : 02 Apr 2024  
**Tested** : 10 Apr 2024  
**Diagnosed** : 10 Apr 2024 - Bill Quesnel

### JENISH ENGINEERING LIMITED

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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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