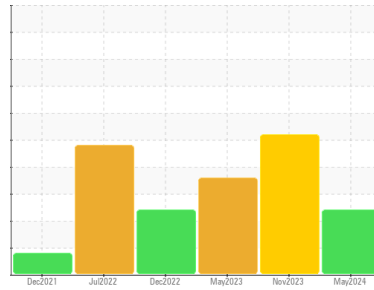




# OIL ANALYSIS REPORT

Sample Rating Trend



**WEAR PARTICLES**



Machine Id  
**TIMM #1 PLUNGER 4**  
 Component  
**Gearbox**  
 Fluid  
**SHELL OMALA S2 G 68 (--- GAL)**

**DIAGNOSIS**

**Recommendation**

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

**Wear**

Wear particle analysis indicates that the ferrous rolling and ferrous rubbing particles are abnormal.

**Contaminants**

There is no indication of any contamination in the oil.

**Oil Condition**

The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number	Client Info			<b>CB0031706</b>	CB0031424	CB0031105
Sample Date	Client Info			<b>20 May 2024</b>	26 Nov 2023	22 May 2023
Machine Age	hrs	Client Info		<b>0</b>	0	0
Oil Age	hrs	Client Info		<b>0</b>	0	0
Oil Changed	Client Info			<b>Changed</b>	Changed	Changed
Sample Status				<b>ABNORMAL</b>	ABNORMAL	ABNORMAL

CONTAMINATION		method	limit/base	current	history1	history2
Water	WC Method		>0.2	<b>NEG</b>	NEG	NEG

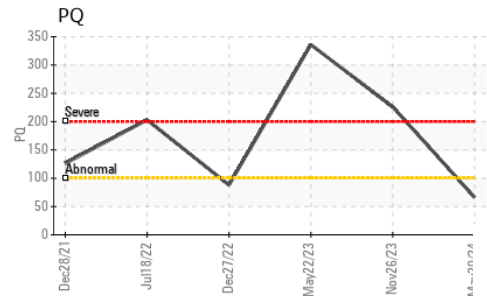
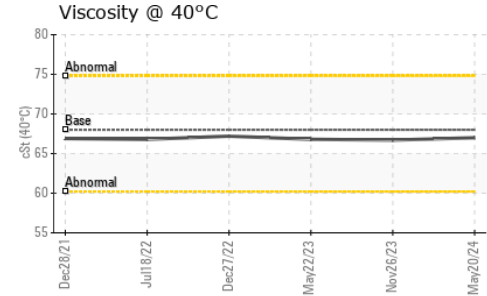
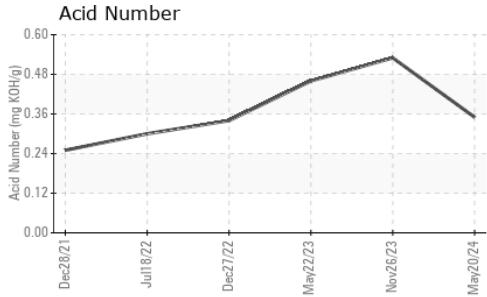
WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		<b>66</b>	▲ 226	▲ 336
Iron	ppm	ASTM D5185(m)	>200	<b>176</b>	▲ 283	▲ 236
Chromium	ppm	ASTM D5185(m)	>15	<b>2</b>	2	2
Nickel	ppm	ASTM D5185(m)	>15	<b>0</b>	<1	0
Titanium	ppm	ASTM D5185(m)		<b>0</b>	0	0
Silver	ppm	ASTM D5185(m)		<b>0</b>	0	0
Aluminum	ppm	ASTM D5185(m)	>25	<b>0</b>	<1	<1
Lead	ppm	ASTM D5185(m)	>100	<b>0</b>	<1	0
Copper	ppm	ASTM D5185(m)	>200	<b>&lt;1</b>	2	1
Tin	ppm	ASTM D5185(m)	>25	<b>0</b>	0	0
Antimony	ppm	ASTM D5185(m)	>5	<b>0</b>	0	0
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)	6.2	<b>0</b>	<1	<1
Barium	ppm	ASTM D5185(m)	0.0	<b>0</b>	0	0
Molybdenum	ppm	ASTM D5185(m)	0	<b>0</b>	0	0
Manganese	ppm	ASTM D5185(m)		<b>&lt;1</b>	<1	1
Magnesium	ppm	ASTM D5185(m)	0	<b>0</b>	<1	<1
Calcium	ppm	ASTM D5185(m)	0.0	<b>0</b>	<1	0
Phosphorus	ppm	ASTM D5185(m)	290	<b>287</b>	282	319
Zinc	ppm	ASTM D5185(m)	3.8	<b>14</b>	25	16
Sulfur	ppm	ASTM D5185(m)	8167	<b>7524</b>	8023	7751
Lithium	ppm	ASTM D5185(m)		<b>&lt;1</b>	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>50	<b>&lt;1</b>	2	2
Sodium	ppm	ASTM D5185(m)		<b>&lt;1</b>	<1	<1
Potassium	ppm	ASTM D5185(m)	>20	<b>&lt;1</b>	<1	<1

FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*		<b>0.35</b>	0.53	0.46

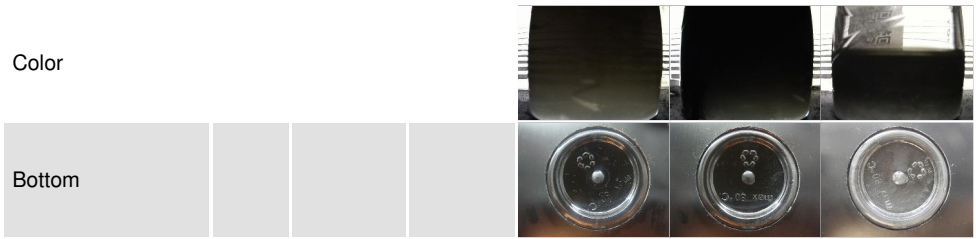
# OIL ANALYSIS REPORT



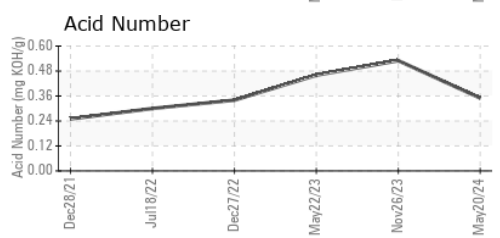
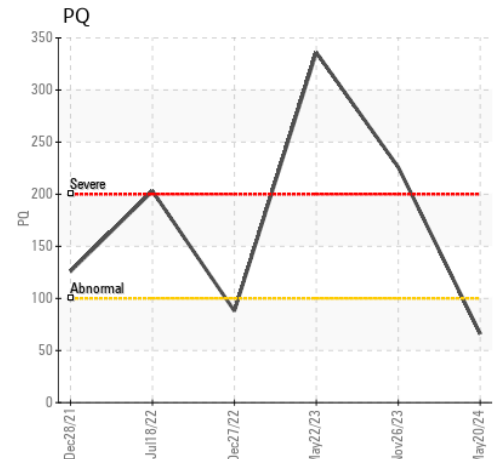
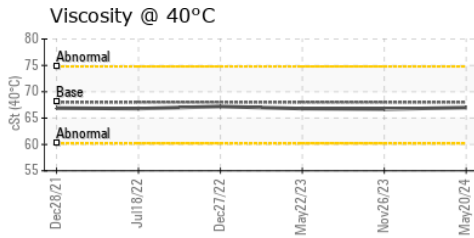
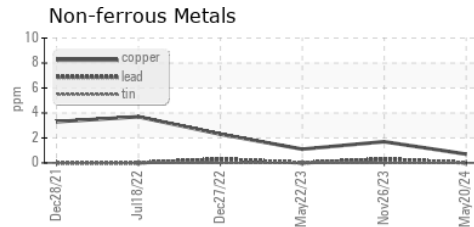
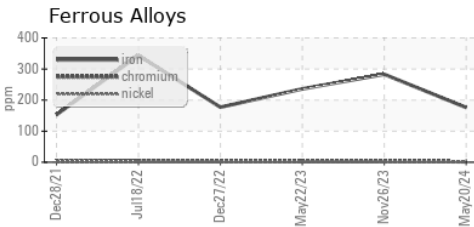
VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	<b>LIGHT</b>	LIGHT
Yellow Metal	scalar	Visual*	NONE	<b>NONE</b>	NONE
Precipitate	scalar	Visual*	NONE	<b>NONE</b>	NONE
Silt	scalar	Visual*	NONE	<b>NONE</b>	VLITE
Debris	scalar	Visual*	NONE	<b>NONE</b>	NONE
Sand/Dirt	scalar	Visual*	NONE	<b>NONE</b>	NONE
Appearance	scalar	Visual*	NORML	<b>NORML</b>	NORML
Odor	scalar	Visual*	NORML	<b>NORML</b>	NORML
Emulsified Water	scalar	Visual*	>0.2	<b>NEG</b>	NEG
Free Water	scalar	Visual*		<b>NEG</b>	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	68.0	<b>67.0</b>	66.7

SAMPLE IMAGES	method	limit/base	current	history1	history2
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## GRAPHS



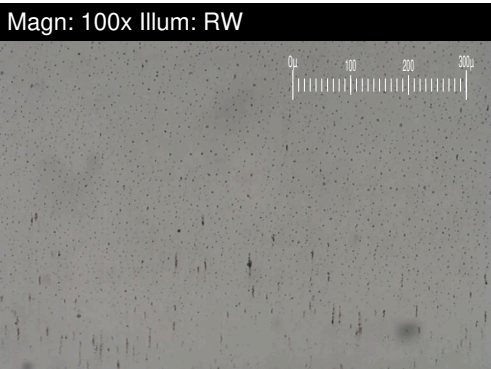
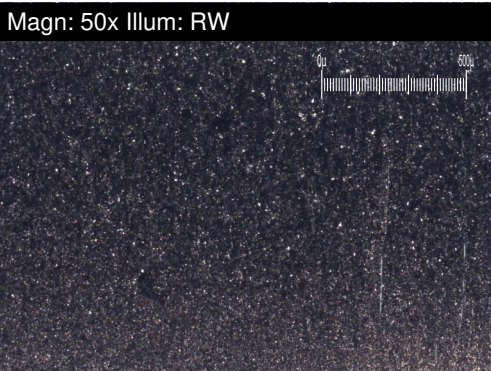
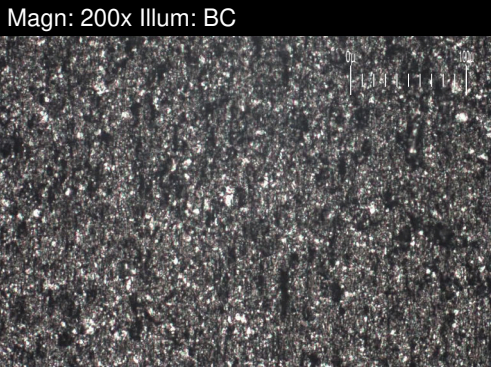
**Laboratory** : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9  
**Sample No.** : CB0031706  
**Lab Number** : 02641161  
**Unique Number** : 5798700  
**Test Package** : IND 3  
**Received** : 11 Jun 2024  
**Tested** : 14 Jun 2024  
**Diagnosed** : 14 Jun 2024 - Kevin Marson

**TOYOTA MOTOR MANUFACT.**  
 1055 FOUNTAIN STREET N.  
 CAMBRIDGE, ON  
 CA N3H 5K2  
 Contact: mike clappison  
 mike.clappison@toyota.com  
 T: (519)212-5023  
 F: (519)653-9638

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.

# FERROGRAPHY REPORT

Machine Id  
**TIMM #1 PLUNGER 4**  
Component  
**Gearbox**  
Fluid  
**SHELL OMALA S2 G 68 (--- GAL)**

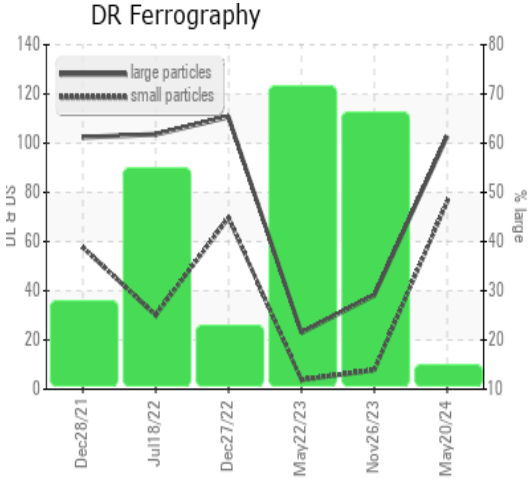


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		<b>102.7</b>	38.2	23.0
Small Particles		DR-Ferr*		<b>76.2</b>	7.8	3.8
Total Particles		DR-Ferr*	>---	<b>178.9</b>	46	26.8
Large Particles Percentage	%	DR-Ferr*		<b>14.8</b>	66.1	71.6
Severity Index		DR-Ferr*		<b>2722</b>	1161	442

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		<span style="color: orange;">▲</span> <span style="background-color: orange; width: 100px; height: 10px; display: inline-block;"></span> <span style="color: orange;">▲</span>	<span style="color: orange;">▲</span> <span style="background-color: orange; width: 100px; height: 10px; display: inline-block;"></span> <span style="color: orange;">▲</span>	<span style="color: orange;">▲</span> <span style="background-color: orange; width: 100px; height: 10px; display: inline-block;"></span> <span style="color: orange;">▲</span> 8
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		<span style="color: orange;">▲</span> <span style="background-color: orange; width: 100px; height: 10px; display: inline-block;"></span> <b>5</b>	<span style="color: orange;">▲</span> <span style="background-color: orange; width: 100px; height: 10px; display: inline-block;"></span> 5	<span style="color: green;">▲</span> <span style="background-color: green; width: 100px; height: 10px; display: inline-block;"></span> 3
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*		<span style="color: green;">■</span> <b>1</b>	<span style="color: green;">■</span> 2	
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*				
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*				
Nonferrous Rolling	Scale 0-10	ASTM D7684*				
Nonferrous Other	Scale 0-10	ASTM D7684*				
Carbonaceous Material	Scale 0-10	ASTM D7684*				
Lubricant Degradation	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*		<span style="color: green;">■</span> <b>1</b>	<span style="color: green;">■</span> 1	<span style="color: green;">■</span> 1
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		<span style="color: green;">■</span> <b>1</b>	<span style="color: green;">■</span> 1	<span style="color: green;">■</span> 1

### WEAR

Wear particle analysis indicates that the ferrous rolling and ferrous rubbing particles are abnormal.



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