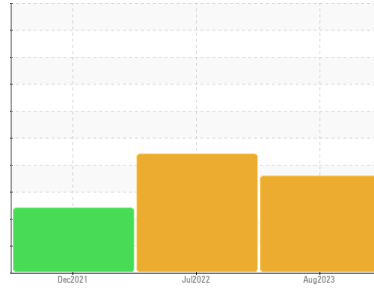


PROBLEM SUMMARY

Sample Rating Trend

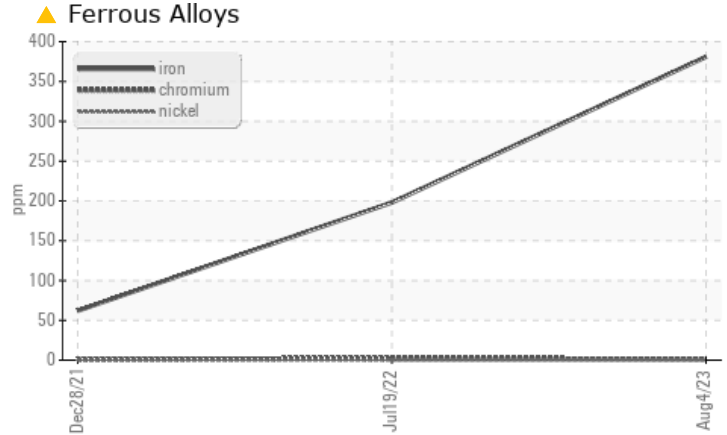
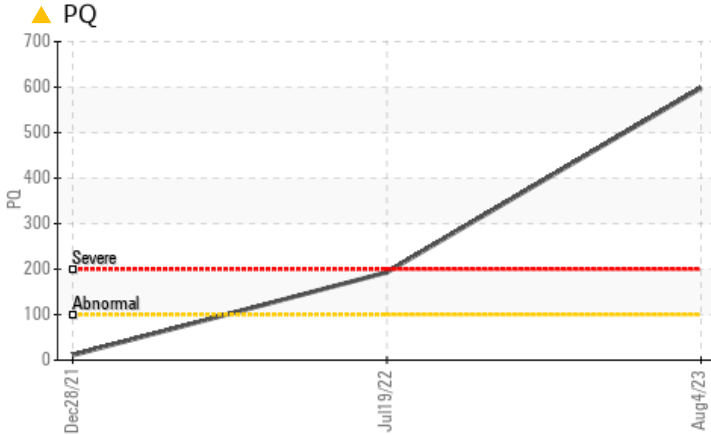


WEAR



Machine Id
TIMM #2 PLUNGER 4
Component
Gearbox
Fluid
SHELL OMALA S2 G 68 (--- GAL)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition. No other corrective action is recommended at this time. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

PROBLEMATIC TEST RESULTS

Sample Status			ABNORMAL	ABNORMAL	ABNORMAL
PQ	ASTM D8184*		▲ 598	193	11
Iron	ppm	ASTM D5185(m) >200	▲ 381	▲ 198	62
Ferrous Rubbing	Scale 0-10	ASTM D7684*	▲ 7	▲ 10	10

Customer Id: TOYCAM
Sample No.: CB0031440
Lab Number: 02579126
Test Package: IND 3



To manage this report scan the QR code

To discuss the diagnosis or test data:
Kevin Marson +1 (289)291-4644 x4644
Kevin.Marson@wearcheck.com

To change component or sample information:
Gloria Gonzalez +1 (289)291-4643 x4643
gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Resample	---	---	?	We recommend an early resample to monitor this condition.
Information Required	---	---	?	NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

HISTORICAL DIAGNOSIS

WEAR PARTICLES



19 Jul 2022 Diag: Kevin Marson

We advise that you check for visible metal particles in the oil. 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 particle analysis indicates that the ferrous rolling and ferrous rubbing particles are abnormal. Iron ppm levels are noted. Moderate concentration of visible metal present. Gear wear is indicated. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. There is no indication of any contamination in the oil. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

view report



WEAR PARTICLES



28 Dec 2021 Diag: Kevin Marson

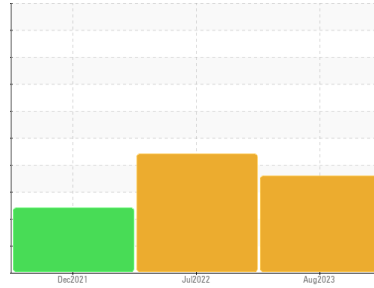
The oil change at the time of sampling has been noted. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. Wear particle analysis indicates that the ferrous rolling and ferrous rubbing particles are abnormal. There is no indication of any contamination in the oil. Additive levels indicate the addition of a different brand, or type of oil. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

view report



OIL ANALYSIS REPORT

Sample Rating Trend



WEAR



Machine Id
TIMM #2 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. No other corrective action is recommended at this time. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

Wear

PQ levels are abnormal. Iron ppm levels are abnormal. Wear particle analysis indicates that the ferrous rubbing particles are marginal. Gear wear is indicated. The high ferrous density (PQ) index indicates that abnormal wear is occurring.

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		CB0031440	CB0031114	CB0030626
Sample Date	Client Info		04 Aug 2023	19 Jul 2022	28 Dec 2021
Machine Age	hrs	Client Info	0	0	0
Oil Age	hrs	Client Info	0	0	0
Oil Changed	Client Info		Changed	Changed	Changed
Sample Status			ABNORMAL	ABNORMAL	ABNORMAL

WEAR METALS

	method	limit/base	current	history1	history2
PQ	ASTM D8184*		▲ 598	193	11
Iron	ppm	ASTM D5185(m) >200	▲ 381	▲ 198	62
Chromium	ppm	ASTM D5185(m) >15	2	2	1
Nickel	ppm	ASTM D5185(m) >15	0	0	<1
Titanium	ppm	ASTM D5185(m)	0	0	0
Silver	ppm	ASTM D5185(m)	0	0	0
Aluminum	ppm	ASTM D5185(m) >25	<1	<1	<1
Lead	ppm	ASTM D5185(m) >100	<1	<1	<1
Copper	ppm	ASTM D5185(m) >200	10	22	8
Tin	ppm	ASTM D5185(m) >25	0	0	0
Antimony	ppm	ASTM D5185(m) >5	0	0	0
Vanadium	ppm	ASTM D5185(m)	0	0	0
Beryllium	ppm	ASTM D5185(m)	0	0	0
Cadmium	ppm	ASTM D5185(m)	0	0	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m) 6.2	0	<1	<1
Barium	ppm	ASTM D5185(m) 0.0	0	4	39
Molybdenum	ppm	ASTM D5185(m) 0	0	0	0
Manganese	ppm	ASTM D5185(m)	2	2	<1
Magnesium	ppm	ASTM D5185(m) 0	<1	<1	1
Calcium	ppm	ASTM D5185(m) 0.0	<1	1	4
Phosphorus	ppm	ASTM D5185(m) 290	302	270	314
Zinc	ppm	ASTM D5185(m) 3.8	29	33	37
Sulfur	ppm	ASTM D5185(m) 8167	7858	8001	8074
Lithium	ppm	ASTM D5185(m)	<1	<1	<1

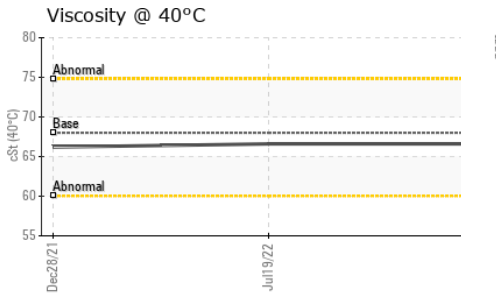
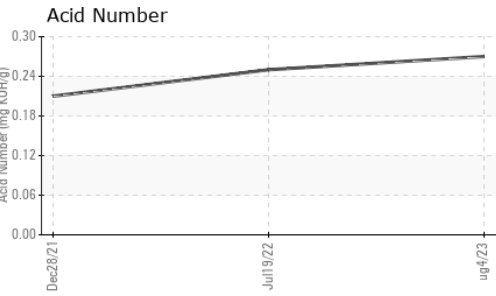
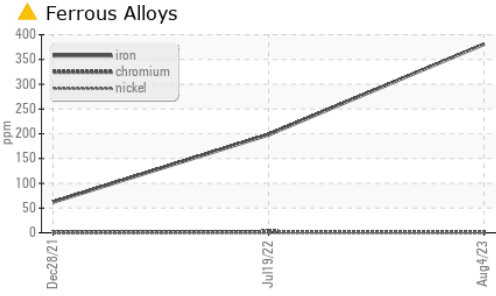
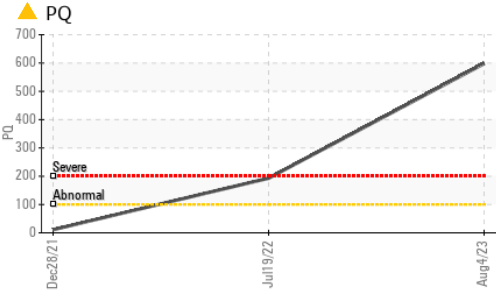
CONTAMINANTS

	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m) >50	2	2	3
Sodium	ppm	ASTM D5185(m)	<1	<1	1
Potassium	ppm	ASTM D5185(m) >20	0	<1	<1

FLUID DEGRADATION

	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.27	0.25	0.21

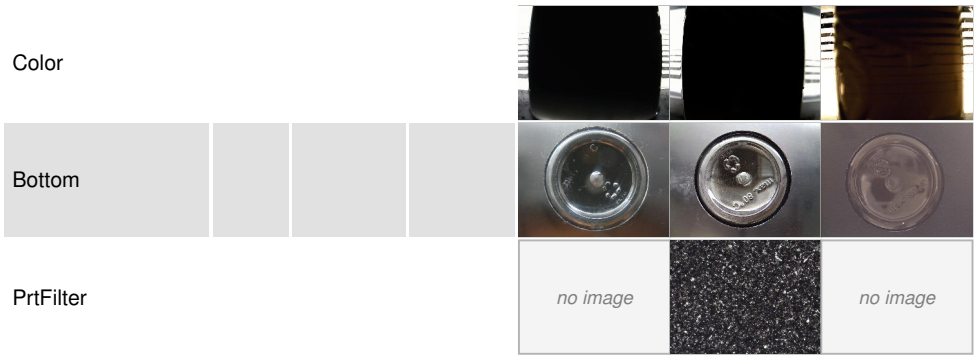
OIL ANALYSIS REPORT



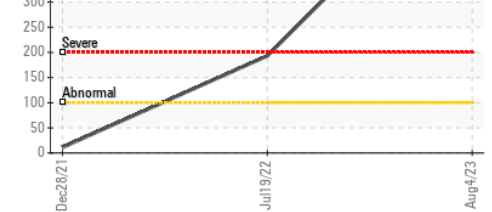
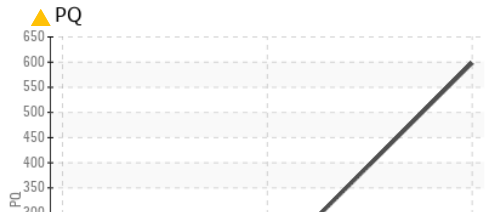
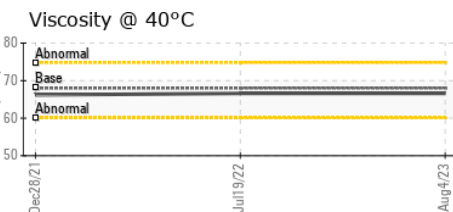
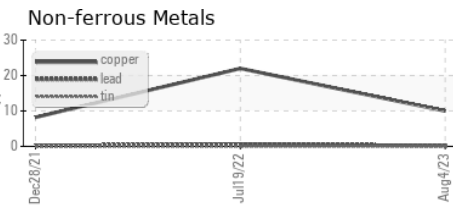
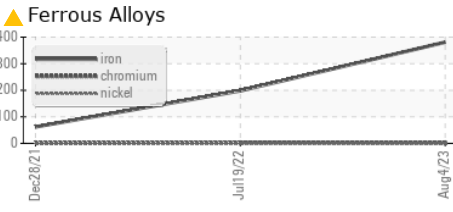
VISUAL	method	limit/base	current	history1	history2	
White Metal	scalar	Visual*	NONE	VLITE	▲ MODER	VLITE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Precipitate	scalar	Visual*	NONE	NONE	NONE	NONE
Silt	scalar	Visual*	NONE	LIGHT	NONE	NONE
Debris	scalar	Visual*	NONE	NONE	NONE	VLITE
Sand/Dirt	scalar	Visual*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

FLUID PROPERTIES	method	limit/base	current	history1	history2	
Visc @ 40°C	cSt	ASTM D7279(m)	68.0	66.6	66.6	66.2

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. : CB0031440 **Received** : 29 Aug 2023
Lab Number : 02579126 **Diagnosed** : 01 Sep 2023
Unique Number : 5632186 **Diagnostician** : Kevin Marson
Test Package : IND 3

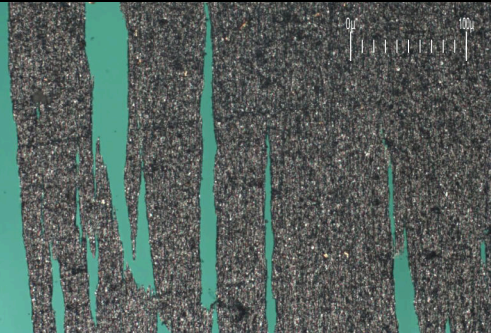
TOYOTA MOTOR MANUFACT.
 1055 FOUNTAIN STREET N.
 CAMBRIDGE, ON
 CA N3H 5K2
 Contact: mike clappison
 mike.clappison@toyota.com
 T: (519)212-5023
 F: (519)653-9638

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.

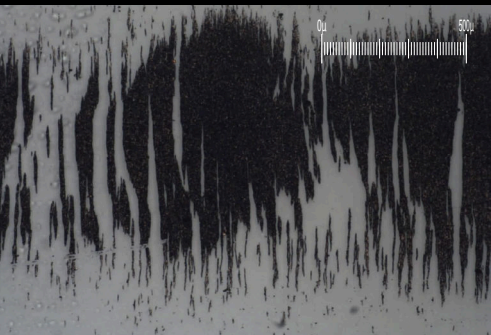
FERROGRAPHY REPORT

Machine Id
TIMM #2 PLUNGER 4
Component
Gearbox
Fluid
SHELL OMALA S2 G 68 (--- GAL)

Magn: 200x Illum: BC



Magn: 50x Illum: RW



Magn: 100x Illum: RW



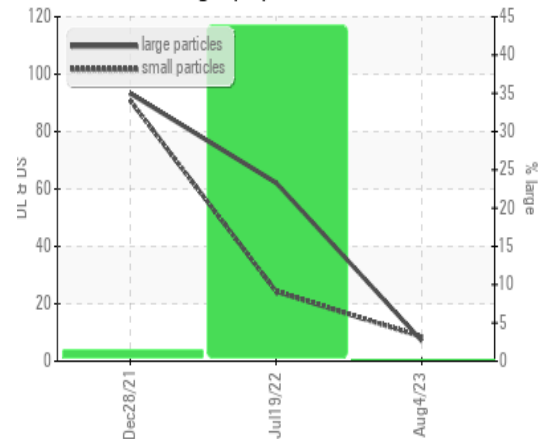
DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		7.1	62.2	93.3
Small Particles		DR-Ferr*		8.5	24.3	90.8
Total Particles		DR-Ferr*	>---	15.6	86.5	184.1
Large Particles Percentage	%	DR-Ferr*		0	43.8	1.4
Severity Index		DR-Ferr*		10	2357	233

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		7	10	10
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		3	5	5
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*		1	1	1
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*		1	1	1
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		2	1	2

WEAR

PQ levels are abnormal. Iron ppm levels are abnormal. Wear particle analysis indicates that the ferrous rubbing particles are marginal. Gear wear is indicated. The high ferrous density (PQ) index indicates that abnormal wear is occurring.

DR Ferrography



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