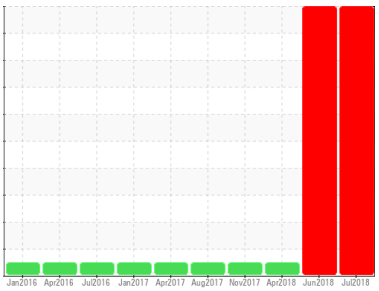
PROBLEM SUMMARY

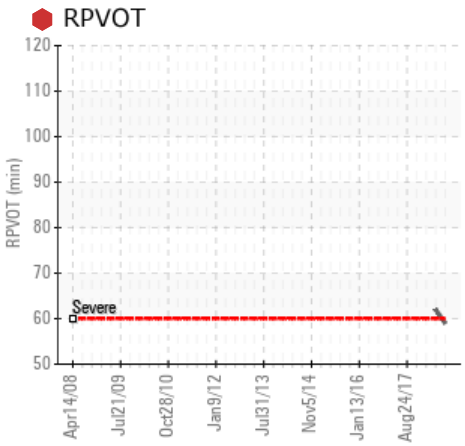
Sample Rating Trend

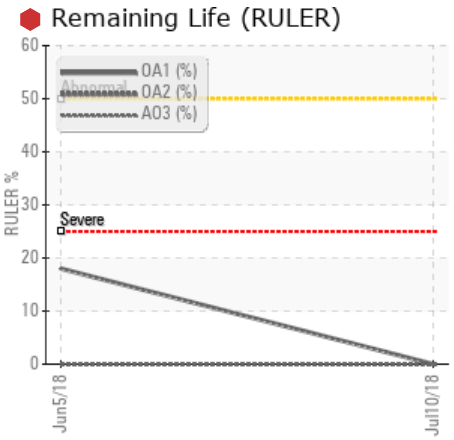


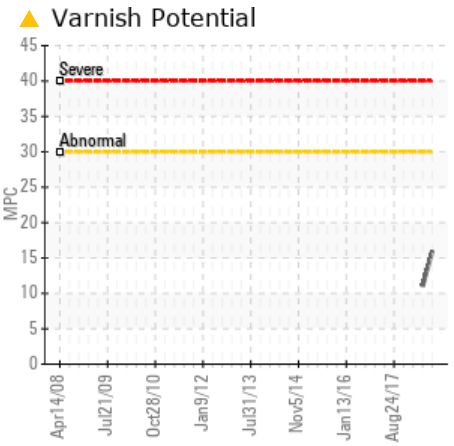
DEGRADATION

Area
SAB2
Machine Id
SAB2 G20 Thrust
Component
Babbitt Bearing N/A Bearing
Fluid
ESSO TERESSO ISO 46 (5000 LTR)

COMPONENT CONDITION SUMMARY







RECOMMENDATION

*** NOTE: This is a rediagnosed report, based on input from the customer. A filter patch was performed and ferrogram re-done as the result of a bearing failure (see CAR 40154). *** We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. We advise that you check for visible metal particles in the oil. We recommend that you investigate the system for introduction of a surfactant to the reservoir. Some potential surfactants include incorrect oil make-up with an oil containing emulsifying agents (engine oil, compressor oil, gear oil), or soaps entering the system after wash down. The oil is near the end of it`s useful service life, recommend schedule an oil change. An inspection for the source of wear may be warranted at this time. We recommend an early resample to monitor this condition. No other corrective action is recommended at this time.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	SEVERE	NORMAL
Ferrous Cutting	Scale 0-10	ASTM D7684		**2**		
Anti-Oxidant 1	%	ASTM D6971	<25	**0**	18	---
Anti-Oxidant 2	%	ASTM D6971	<25	**0**	0	---
MPC Varnish Potential	Scale	ASTM D7843	>15	**16**	11	---
Babbitt	scalar	Visual	NONE	**LIGHT**	NONE	NONE
Air Release Time	min	ASTM D3427		**9.52**	9.34	---
Foam Tendency	I/II/III	ASTM D892	50	**570/110/560**	560/100/560	---
Foam Stability	I/II/III	ASTM D892	0	**170/0/170**	200/0/200	---
Rotary Bomb Oxidation Test	minutes	ASTM D2272	600	**59**	62	---
PrtFilter					*no image*	*no image*

Customer Id: CUSANY
Sample No.: WC1234567
Lab Number: 01234567
Test Package: AOM 3

To manage this report scan the QR code

To discuss the diagnosis or test data:
Bill Quesnel CLS,OMA II,MLA-III,LLA-I +1 (905)569-8600 x4641
Bill.Quesnel@wearcheck.com

To change component or sample information:
Gloria Gonzalez +1 (905)569-8600 x4643
gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS

Action	Status	Date	Done By	Description
Service/change Fluid	MISSED	Sep 12 2018	?	The oil is near the end of it's useful service life, recommend schedule an oil change.
Resample	MISSED	Sep 12 2018	?	We recommend an early resample to monitor this condition.
Alert	MISSED	Sep 12 2018	?	NOTE: We recommend using Advanced Oil Monitoring (AOM) kits for this system. The AOM test package includes advanced level testing to determine the suitability of turbine and large industrial compressor oils for continued use.
Check For Visual Metal	MISSED	Sep 13 2018	?	We advise that you check for visible metal particles in the oil.
Filter Fluid	MISSED	Sep 12 2018	?	We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability.

HISTORICAL DIAGNOSIS

DEGRADATION

05 Jun 2018 Diag: Kevin Marson

We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. We recommend that you investigate the system for introduction of a surfactant to the reservoir. Some potential surfactants include incorrect oil make-up with an oil containing emulsifying agents (engine oil, compressor oil, gear oil), or soaps entering the system after wash down. The oil is near the end of it`s useful service life, recommend schedule an oil change. We recommend an early resample to monitor this condition.All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. MPC (Membrane Patch Calorimetery) test indicates acceptable levels of varnish present. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. Water Separability results (ASTM D1401) indicate good water shedding properties. The system and fluid cleanliness is acceptable. Foaming Stability (ASTM D892) results are abnormal indicating an oil foaming problem that could lead to erratic operation. Linear Sweep Voltammetry (RULER– ASTM D6971) testing indicates both anti-oxidants present in the oil will soon be depleted. The relatively low Rotating Pressure Vessel Oxidation Test (RPVOT – ASTM D2272) result indicates less than 25% of the remaining anti-oxidant(s) present in the oil. The Air Release Value (ASTM D3427) indicates that the oil has good deaeration properties. The AN level is acceptable for this fluid.

view report

NORMAL

05 Apr 2018 Diag: Wes Davis

Resample at the next service interval to monitor. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using Advanced Oil Monitoring (AOM) kits for this system. The AOM test package includes advanced level testing to determine the suitability of turbine and large industrial compressor oils for continued use.All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service (unconfirmed).

view report

NORMAL

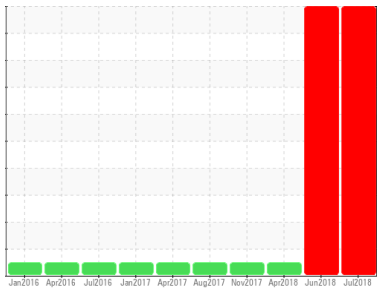
22 Nov 2017 Diag: Wes Davis

Resample at the next service interval to monitor. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using Advanced Oil Monitoring (AOM) kits for this system. The AOM test package includes advanced level testing to determine the suitability of turbine and large industrial compressor oils for continued use.All component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is acceptable for the time in service (unconfirmed).

view report

OIL ANALYSIS REPORT

Sample Rating Trend



DEGRADATION

Area
SAB2
Machine Id
SAB2 G20 Thrust
Component
Babbitt Bearing N/A Bearing
Fluid
ESSO TERESSO ISO 46 (5000 LTR)

DIAGNOSIS

Recommendation

*** NOTE: This is a rediagnosed report, based on input from the customer. A filter patch was performed and ferrogram re-done as the result of a bearing failure (see CAR 40154). *** We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. We advise that you check for visible metal particles in the oil. We recommend that you investigate the system for introduction of a surfactant to the reservoir. Some potential surfactants include incorrect oil make-up with an oil containing emulsifying agents (engine oil, compressor oil, gear oil), or soaps entering the system after wash down. The oil is near the end of it`s useful service life, recommend schedule an oil change. An inspection for the source of wear may be warranted at this time. We recommend an early resample to monitor this condition. No other corrective action is recommended at this time.

Wear

Wear particle analysis indicates that the ferrous cutting particles are abnormal. Moderate concentration of visible metal present (tempered babbit sliding and cutting wear particles). Bearing wear is indicated. A bearing failure may be in process.

Oil Condition

The Air Release Value (ASTM D3427) indicates the oil has poor deaeration properties. Foaming Stability (ASTM D892) results are abnormal indicating an oil foaming problem that could lead to erratic operation. Linear Sweep Voltammetry (RULER– ASTM D6971) testing indicates both anti-oxidants present in the oil will soon be depleted. The relatively low Rotating Pressure Vessel Oxidation Test (RPVOT – ASTM D2272) result indicates less than 25% of the remaining anti-oxidant(s) present 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.

Contaminants

MPC (Membrane Patch Calorimetery) test indicates a light concentration of varnish present. The water content is negligible. Water Separability results (ASTM D1401) indicate good water shedding properties.

SAMPLE INFORMATION	method	limit/base	current	history 1	history 2
Sample Number			**PP**	PP964862	WC22128958
Sample Date			**10 Jul 2018**	05 Jun 2018	05 Apr 2018
Machine Age	hrs		**0**	0	0
Oil Age	hrs		**0**	0	0
Oil Changed			**N/A**	N/A	N/A
Sample Status			**SEVERE**	SEVERE	NORMAL

WEAR METALS		method	limit/base	current	history 1	history 2
PQ		In-house		**29**	0	---
Iron	ppm	ASTM D5185	>20	**0.5**	0.4	0.6
Chromium	ppm	ASTM D5185	>20	**0.0**	0.0	0.0
Nickel	ppm	ASTM D5185	>20	**0.0**	0.2	0.0
Titanium	ppm	ASTM D5185		**0.0**	0.0	0.0
Silver	ppm	ASTM D5185		**0.0**	0.0	0.0
Aluminum	ppm	ASTM D5185	>20	**0.0**	0.0	0.0
Lead	ppm	ASTM D5185	>20	**0.2**	0.0	0.0
Copper	ppm	ASTM D5185	>20	**0.0**	0.1	0.1
Tin	ppm	ASTM D5185	>20	**0.0**	0.0	0.0
Antimony	ppm	ASTM D5185		**0.0**	0.0	0.0
Vanadium	ppm	ASTM D5185		**0.0**	0.0	0.0
Beryllium	ppm	ASTM D5185		**0.0**	0.0	0.0
Cadmium	ppm	ASTM D5185		**0.0**	0.0	0.0

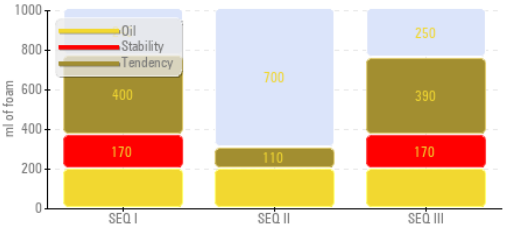
ADDITIVES		method	limit/base	current	history 1	history 2
Boron	ppm	ASTM D5185	0	**0.0**	0.0	0.0
Barium	ppm	ASTM D5185		**0.0**	0.0	0.0
Molybdenum	ppm	ASTM D5185	0	**0.0**	0.0	0.0
Manganese	ppm	ASTM D5185		**0.0**	0.0	0.0
Magnesium	ppm	ASTM D5185	0	**0.2**	0.1	0.0
Calcium	ppm	ASTM D5185	0	**0.3**	0.0	0.0
Phosphorus	ppm	ASTM D5185	2.4	**2.8**	1.8	2.7
Zinc	ppm	ASTM D5185	0	**0.7**	0.1	0.1
Sulfur	ppm	ASTM D5185		**1395**	1287	1371
Lithium	ppm	ASTM D5185		**0.0**	0.2	0.2

CONTAMINANTS		method	limit/base	current	history 1	history 2
Silicon	ppm	ASTM D5185	>15	**2.2**	1.8	2.4
Sodium	ppm	ASTM D5185		**0.5**	0.4	0.2
Potassium	ppm	ASTM D5185	>20	**0.0**	0.0	0.0
Water	%	ASTM D6304	>0.1	**0.000**	0.000	---
ppm Water	ppm	ASTM D6304	>1000	**0.3**	1.8	---

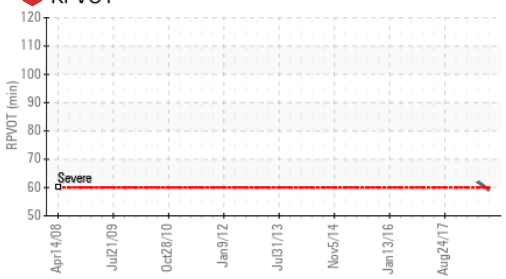
FLUID CLEANLINESS	method	limit/base	current	history 1	history 2
Particles >4µm	ASTM D7647	>10000	**2684**	501	456
Particles >6µm	ASTM D7647	>2500	**272**	107	94
Particles >14µm	ASTM D7647	>160	**10**	11	9
Particles >21µm	ASTM D7647	>40	**4**	4	4
Particles >38µm	ASTM D7647	>10	**0**	0	0
Particles >71µm	ASTM D7647	>3	**0**	0	0
Oil Cleanliness	ISO 4406 (c)	>20/18/14	**19/15/10**	16/14/11	16/14/10

OIL ANALYSIS REPORT

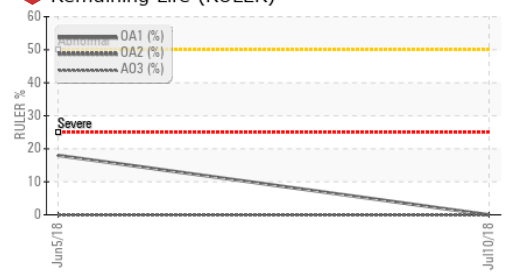
Foaming SEQ I/II/III



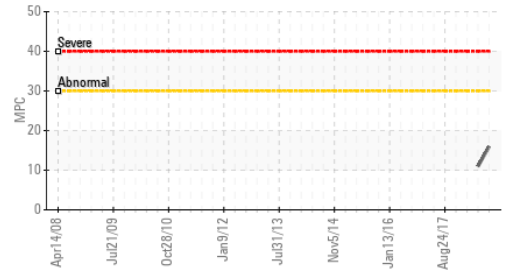
RPVOT



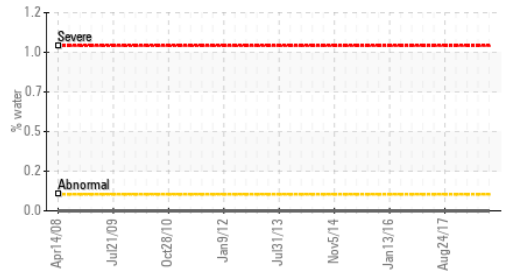
Remaining Life (RULER)



Varnish Potential



Water

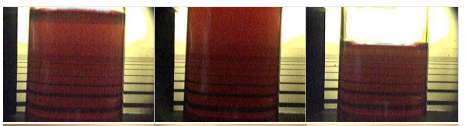
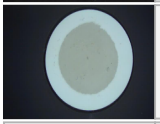


FLUID DEGRADATION		method	limit/base	current	history 1	history 2
Acid Number (AN)	mg KOH/g	ASTM D664	0.02	**0.125**	0.119	0.124
Anti-Oxidant 1	%	ASTM D6971	<25	**0**	18	---
Anti-Oxidant 2	%	ASTM D6971	<25	**0**	0	---
MPC Varnish Potential	Scale	ASTM D7843	>15	**16**	11	---

VISUAL		method	limit/base	current	history 1	history 2
White Metal	scalar	Visual	NONE	**NONE**	NONE	NONE
Babbitt	scalar	Visual	NONE	**LIGHT**	NONE	NONE
Precipitate	scalar	Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	Visual	NONE	**NONE**	NONE	NONE
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	>0.1	**NEG**	NEG	NEG
Free Water	scalar	Visual		**NEG**	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history 1	history 2
Visc @ 40°C	cSt	ASTM D7279	46	**48.0**	47.9	48.1
Visc @ 100°C	cSt	ASTM D7279	6.36	**6.8**	6.8	---
Viscosity Index (VI)	Scale	ASTM D2270	81	**94**	94	---
Separability	oil/h2o/em	ASTM D1401	//	**40/39/1**	41/39/0	---
Air Release Time	min	ASTM D3427		**9.52**	9.34	---
Foam Tendency	I/II/III	ASTM D892	50	**570/110/560**	560/100/560	---
Foam Stability	I/II/III	ASTM D892	0	**170/0/170**	200/0/200	---
ASTM Color	scalar	ASTM D1500		**5.5**	6.0	---
Rust Prevention	PASS/FAIL	ASTM D665		**PASS**	PASS	---
Rotary Bomb Oxidation Test	minutes	ASTM D2272	600	**59**	62	---

SEDIMENT		method	limit/base	current	history 1	history 2
Pentane Insolubles	%	ASTM D893		**0.209**	0.052	---
Toluene Insolubles	%	ASTM D893		**0.028**	0.044	---

SAMPLE IMAGES	method	limit/base	current	history 1	history 2
Color					
Bottom					
PrtFilter				*no image*	*no image*
MPC				*no image*	*no image*
Filter Image 1			*no image*	*no image*	*no image*
Filter Image 2			*no image*	*no image*	*no image*

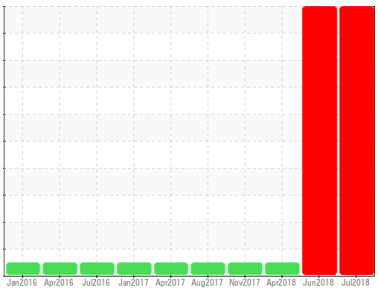
Laboratory
Sample No.
Lab Number
Unique Number
Test Package

Certificate CA01/2674

To discuss diagnosis or test data
To change component or sample

FERROGRAPHY REPORT

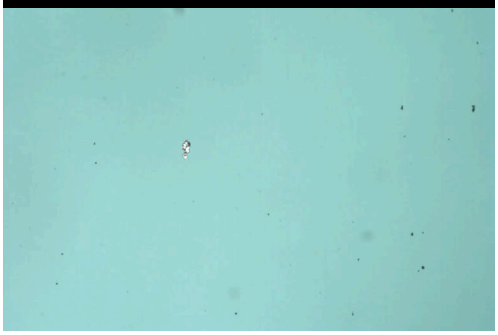
Sample Rating Trend



DEGRADATION

Area
SAB2
Machine Id
SAB2 G20 Thrust
Component
Babbitt Bearing N/A Bearing
Fluid
ESSO TERESSO ISO 46 (5000 LTR)

Magn: 200x Illum: BC



Magn: 50x Illum: RW

Magn: 100x Illum: RW

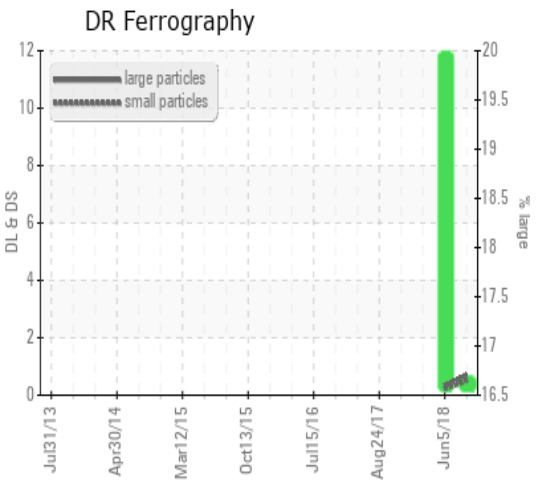
Magn: 200x Illum:

DR-FERROGRAPHY		method	limit/base	current	history 1	history 2
Large Particles		DR-Ferr		**0.7**	0.3	---
Small Particles		DR-Ferr		**0.5**	0.2	---
Total Particles		DR-Ferr	>0.0	**1.2**	0.5	---
Large Particles Percentage	%	DR-Ferr		**16.7**	20	---
Severity Index		DR-Ferr		**0.1**	0	---

FERROGRAPHY		method	limit/base	current	history 1	history 2
Ferrous Rubbing	Scale 0-10	ASTM D7684			1	
Ferrous Sliding	Scale 0-10	ASTM D7684				
Ferrous Cutting	Scale 0-10	ASTM D7684		**2**		
Ferrous Rolling	Scale 0-10	ASTM D7684			1	
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				
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	
Fibres	Scale 0-10	ASTM D7684				
Spheres	Scale 0-10	ASTM D7684				
Other	Scale 0-10	ASTM D7684			1	

WEAR

Wear particle analysis indicates that the ferrous cutting particles are abnormal. Moderate concentration of visible metal present (tempered babbit sliding and cutting wear particles). Bearing wear is indicated. A bearing failure may be in process.



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