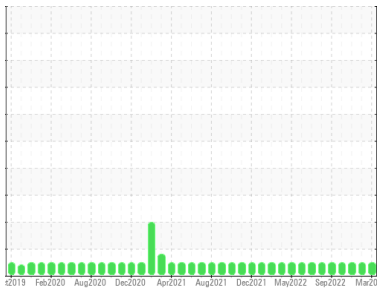
OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL

Area
Catlettsburg
Machine Id
[Catlettsburg] Oil - Port Main Engine
Component
Port Main Engine
Fluid
ZINC-FREE ENGINE OIL SAE 40 (250 GAL)

DIAGNOSIS

Recommendation
Resample at the next service interval to monitor.

Wear
All component wear rates are normal.

Contamination
There is no indication of any contamination in the oil.

Fluid Condition
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**WC0769550**	WC0769496	WC0769540
Sample Date		Client Info		**28 Mar 2024**	08 Aug 2023	21 Jun 2023
Machine Age	hrs	Client Info		**22332**	0	18877
Oil Age	hrs	Client Info		**22332**	19497	18877
Oil Changed		Client Info		**Changed**	Not Changd	Oil Added
Sample Status				**NORMAL**	NORMAL	NORMAL

CONTAMINATION		method	limit/base	current	history1	history2
Fuel		WC Method	>4.0	**<1.0**	<1.0	<1.0
Water		WC Method	>0.1	**NEG**	NEG	NEG
Glycol		WC Method		**NEG**	NEG	NEG

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>75	**9**	15	12
Chromium	ppm	ASTM D5185m	>8	**<1**	2	1
Nickel	ppm	ASTM D5185m	>2	**0**	0	0
Titanium	ppm	ASTM D5185m	>3	**0**	0	0
Silver	ppm	ASTM D5185m	>2	**0**	0	0
Aluminum	ppm	ASTM D5185m	>15	**2**	4	<1
Lead	ppm	ASTM D5185m	>18	**1**	3	1
Copper	ppm	ASTM D5185m	>80	**5**	7	8
Tin	ppm	ASTM D5185m	>14	**2**	5	3
Vanadium	ppm	ASTM D5185m		**0**	0	0
Cadmium	ppm	ASTM D5185m		**0**	0	0

ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	50	**41**	6	1
Barium	ppm	ASTM D5185m	5	**0**	0	0
Molybdenum	ppm	ASTM D5185m	37	**45**	25	30
Manganese	ppm	ASTM D5185m		**<1**	<1	0
Magnesium	ppm	ASTM D5185m	12	**34**	16	31
Calcium	ppm	ASTM D5185m	3250	**3494**	4469	4047
Phosphorus	ppm	ASTM D5185m	50	**13**	35	40
Zinc	ppm	ASTM D5185m	5	**4**	3	<1
Sulfur	ppm	ASTM D5185m	5750	**2583**	4431	4143

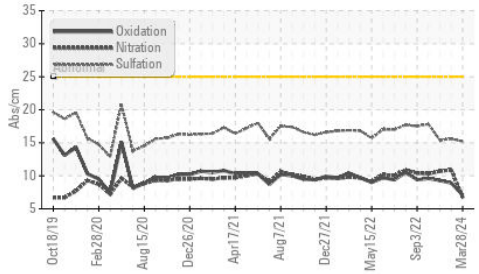
CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>20	**2**	4	4
Sodium	ppm	ASTM D5185m	>75	**1**	3	5
Potassium	ppm	ASTM D5185m	>20	**0**	<1	0

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		**0.7**	0.9	0.6
Nitration	Abs/cm	*ASTM D7624	>20	**6.8**	10.9	10.7
Sulfation	Abs/.1mm	*ASTM D7415	>30	**15.2**	15.6	15.4

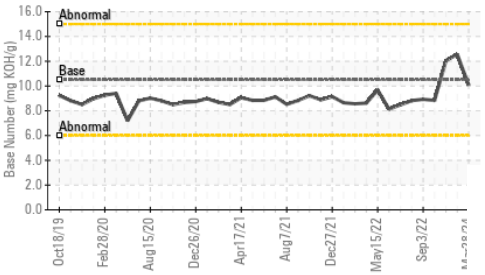
FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	**7.1**	8.9	9.3
Base Number (BN)	mg KOH/g	ASTM D2896	10.5	**10.08**	12.56	12.04

OIL ANALYSIS REPORT

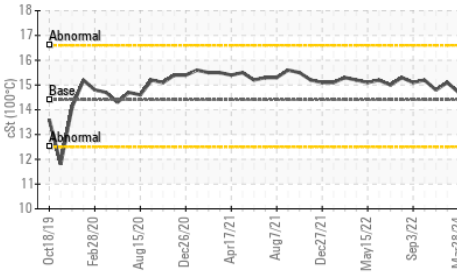
FT-IR (Direct Trend)



Base Number



Viscosity @ 100°C

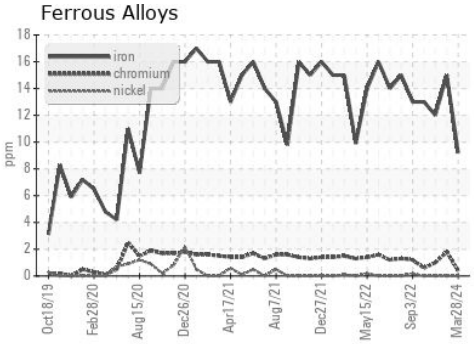


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	**LIGHT**	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	**NONE**	NONE	NONE
Precipitate	scalar	*Visual	NONE	**NONE**	NONE	NONE
Silt	scalar	*Visual	NONE	**NONE**	NONE	NONE
Debris	scalar	*Visual	NONE	**NONE**	NONE	NONE
Sand/Dirt	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

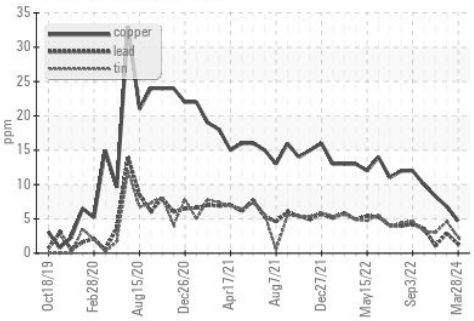
FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	**14.7**	15.1	14.8

GRAPHS

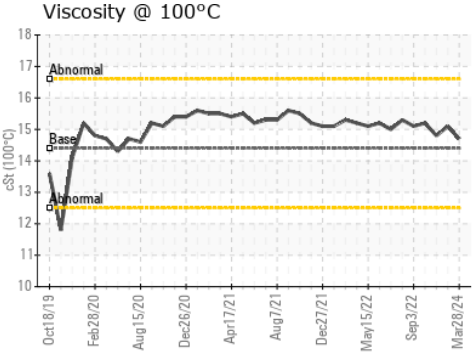
Ferrous Alloys



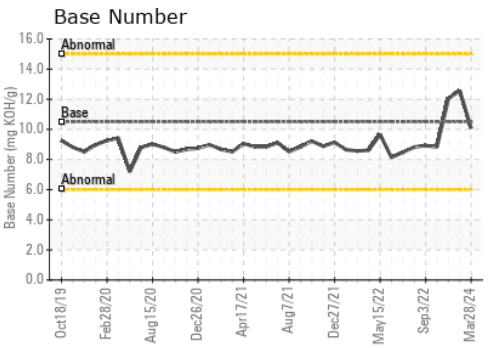
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : WC0769550
Lab Number : 06140132
Unique Number : 10964940
Test Package : IND 2

Received : 05 Apr 2024
Tested : 08 Apr 2024
Diagnosed : 09 Apr 2024 - Sean Felton

To discuss this sample report, contact Customer Service at 1-800-237-1369.
** - Denotes test methods that are outside of the ISO 17025 scope of accreditation.*
Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

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Report Id: MARCAT [WUSCAR] 06140132 (Generated: 04/09/2024 15:12:51) Rev: 1

Submitted By: M/V CATLETTSBURG