



WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Area
GATEWAY EXPRESS

Machine Id
GEX
Component
Starboard Main Engine

Fluid
DIESEL ENGINE OIL SAE 15W40 (75 GAL)

RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		MW0070197	MW0065077	MW0065149
Sample Date		Client Info		31 May 2024	25 Apr 2024	15 Mar 2024
Machine Age	hrs	Client Info		24276	23559	22750
Oil Age	hrs	Client Info		0	0	0
Filter Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Filter Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	MARGINAL	ABNORMAL

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>75	12	13	18
Chromium	ppm	ASTM D5185m	>8	<1	0	<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	1	2	1
Lead	ppm	ASTM D5185m	>18	7	4	4
Copper	ppm	ASTM D5185m	>80	0	0	0
Tin	ppm	ASTM D5185m	>14	0	0	<1
Vanadium	ppm	ASTM D5185m		0	0	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

There is no indication of any contamination in the oil.

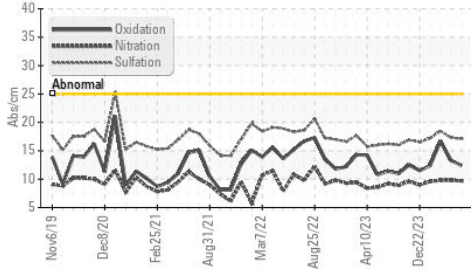
Silicon	ppm	ASTM D5185m	>20	2	2	3
Potassium	ppm	ASTM D5185m	>20	0	<1	0
Fuel		WC Method	>4.0	<1.0	▲ 3.7	▲ 7.0
Water		WC Method	>0.1	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844		0.2	0.2	0.2
Nitration	Abs/cm	*ASTM D7624	>20	9.7	9.8	9.8
Sulfation	Abs/.1mm	*ASTM D7415	>30	17.1	17.3	18.5
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

FLUID CONDITION

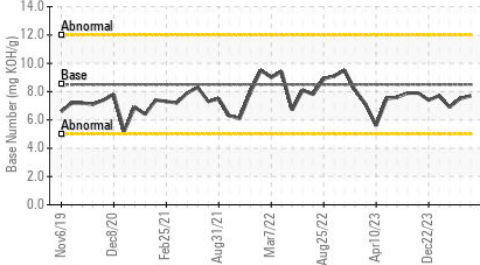
The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185m	>158	2	2	2
Boron	ppm	ASTM D5185m	250	35	44	47
Barium	ppm	ASTM D5185m	10	0	0	0
Molybdenum	ppm	ASTM D5185m	100	42	43	45
Manganese	ppm	ASTM D5185m		<1	<1	<1
Magnesium	ppm	ASTM D5185m	450	8	11	10
Calcium	ppm	ASTM D5185m	3000	3502	3501	3524
Phosphorus	ppm	ASTM D5185m	1150	2	<1	0
Zinc	ppm	ASTM D5185m	1350	0	0	0
Sulfur	ppm	ASTM D5185m	4250	2336	2553	2588
Oxidation	Abs/.1mm	*ASTM D7414	>25	12.4	13.3	16.7
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	7.7	7.5	6.9
Visc @ 100°C	cSt	ASTM D445	14.4	13.5	13.2	▲ 12.3

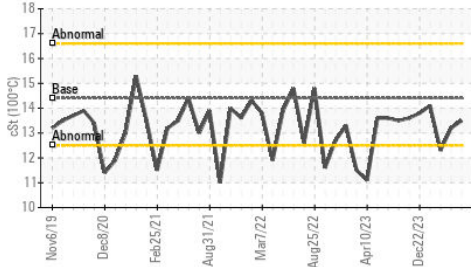
FT-IR (Direct Trend)



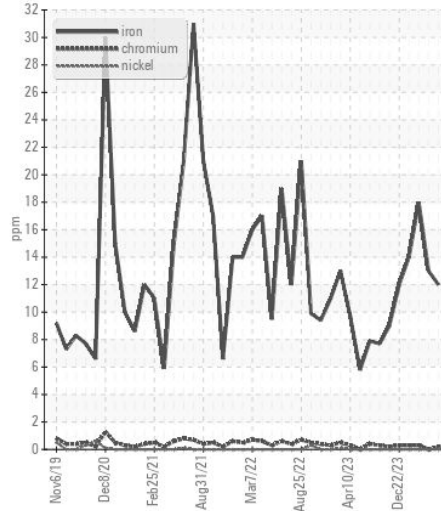
Base Number



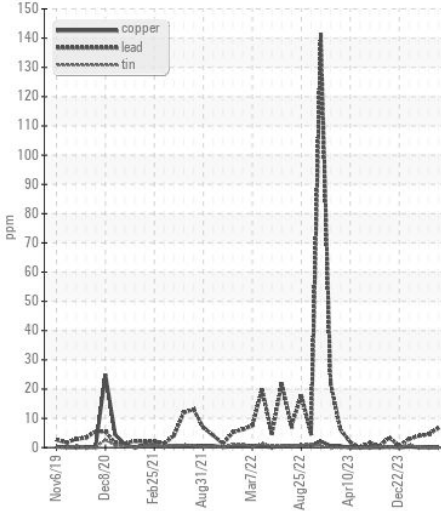
Viscosity @ 100°C



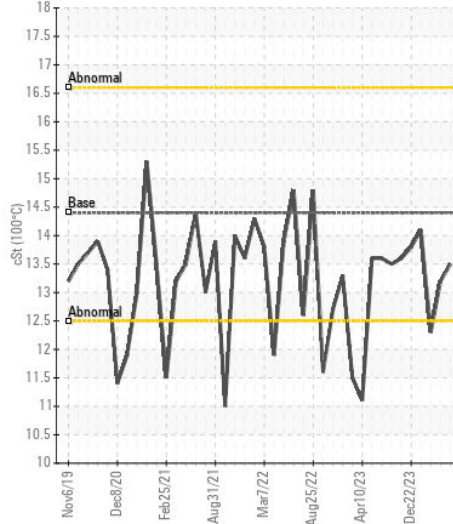
Ferrous Alloys



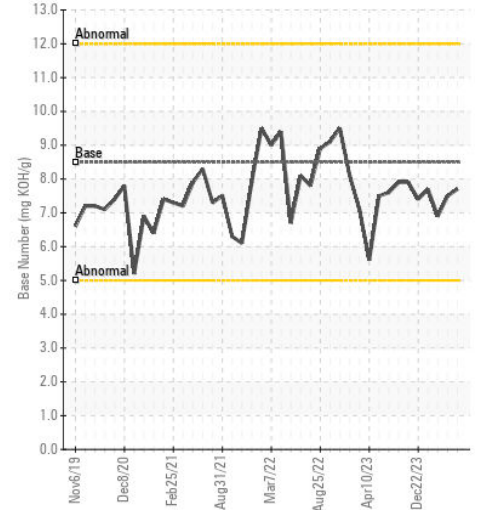
Non-ferrous Metals



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : MW0070197

Lab Number : 06234209

Unique Number : 11123043

Test Package : MAR 2

Received : 11 Jul 2024

Tested : 12 Jul 2024

Diagnosed : 14 Jul 2024 - Don Baldridge

AMERICAN RIVER TRANSPORTATION CO.

P.O. BOX 2889

ST. LOUIS, MO

US 63111

Contact: BRIAN GRIEWING

brian.griewing@adm.com

T:

F: (314)481-5278

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)