



OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	ABNORMAL
FLUID CONDITION	NORMAL

Area
Store 9 - Marietta

Machine Id
1119

Component
Diesel Engine

Fluid
SHELL ROTELLA T 15W40 (--- GAL)

RECOMMENDATION

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		LEC0048273	LEC0044055	LEC0041026
Sample Date		Client Info		06 Mar 2024	30 Nov 2023	19 Oct 2023
Machine Age	mls	Client Info		413303	402327	391093
Oil Age	mls	Client Info		10000	10000	10000
Filter Age	mls	Client Info		10000	10000	10000
Oil Changed		Client Info		Changed	Changed	Changed
Filter Changed		Client Info		Changed	Changed	Changed
Sample Status				ABNORMAL	ABNORMAL	ATTENTION

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>100	32	20	17
Chromium	ppm	ASTM D5185m	>20	0	1	2
Nickel	ppm	ASTM D5185m	>4	0	<1	0
Titanium	ppm	ASTM D5185m		0	<1	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	3	6	4
Lead	ppm	ASTM D5185m	>40	7	▲ 60	● 21
Copper	ppm	ASTM D5185m	>330	7	2	<1
Tin	ppm	ASTM D5185m	>15	0	1	<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

Elemental level of silicon (Si) above normal indicating ingress of seal material.

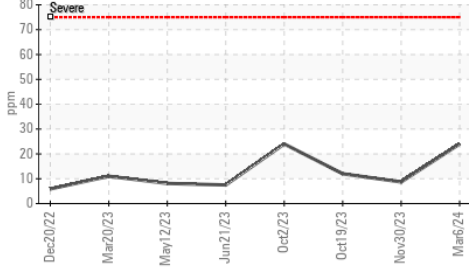
Silicon	ppm	ASTM D5185m	>120	▲ 24	9	12
Potassium	ppm	ASTM D5185m	>20	<1	6	6
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844	>3	0.5	0.9	0.7
Nitration	Abs/cm	*ASTM D7624	>20	6.1	11.5	10.7
Sulfation	Abs/.1mm	*ASTM D7415	>30	16.3	27.4	25.3
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	>0.2	NEG	NEG	NEG

FLUID CONDITION

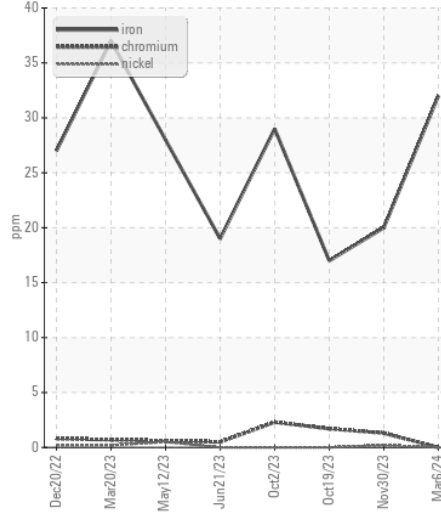
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

Sodium	ppm	ASTM D5185m		3	6	9
Boron	ppm	ASTM D5185m	316	100	147	159
Barium	ppm	ASTM D5185m	0.0	6	0	4
Molybdenum	ppm	ASTM D5185m	1.2	50	136	115
Manganese	ppm	ASTM D5185m		2	<1	<1
Magnesium	ppm	ASTM D5185m	24	127	637	565
Calcium	ppm	ASTM D5185m	2292	3120	1581	1522
Phosphorus	ppm	ASTM D5185m	1064	910	762	795
Zinc	ppm	ASTM D5185m	1160	1095	902	857
Sulfur	ppm	ASTM D5185m	4996	3771	2712	2293
Oxidation	Abs/.1mm	*ASTM D7414	>25	9.3	22.4	19.9
Base Number (BN)	mg KOH/g	ASTM D2896	10.1	9.5	6.9	7.1
Visc @ 100°C	cSt	ASTM D445	15.7	13.4	14.1	13.9

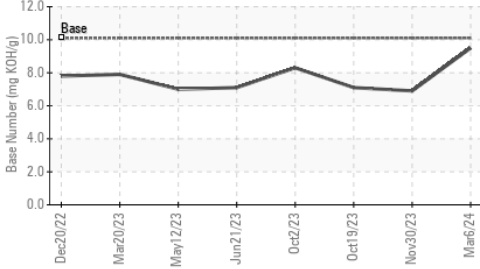
▲ Silicon (ppm)



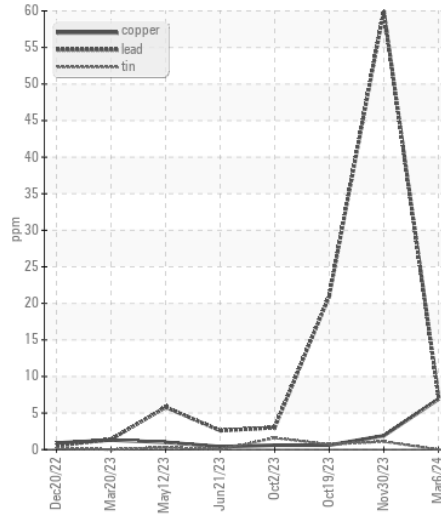
Ferrous Alloys



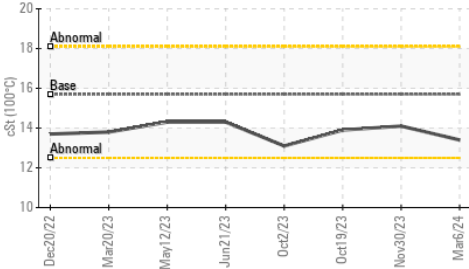
Base Number



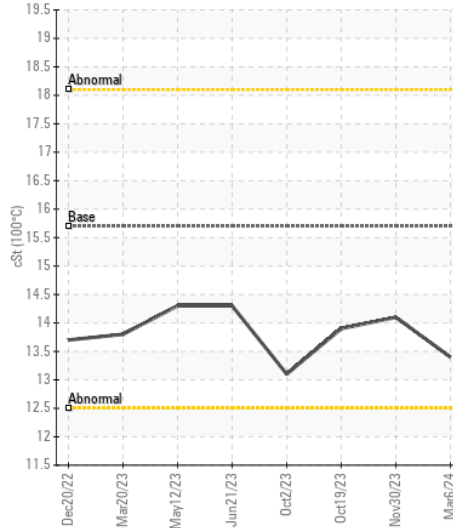
Non-ferrous Metals



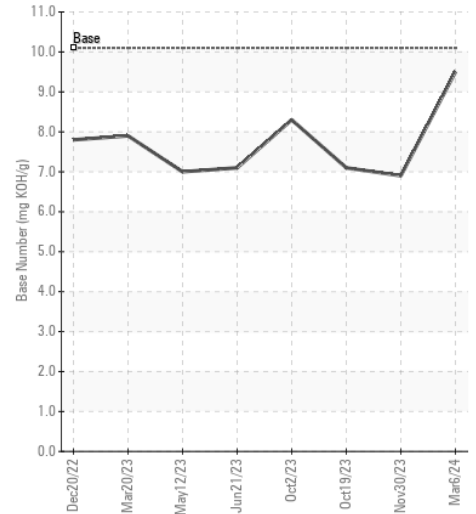
Viscosity @ 100°C



Viscosity @ 100°C



Base Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : LEC0048273 **Received** : 20 Mar 2024
Lab Number : 06123331 **Tested** : 21 Mar 2024
Unique Number : 10937482 **Diagnosed** : 22 Mar 2024 - Sean Felton
Test Package : CONST (Additional Tests: TBN)

HALL DRILLING LLC
 PO BOX 249
 ELLENBORO, WV
 US 26346

Contact: CHRIS PETROVICH
 chrispetrovich@halldrilling.com

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)

T: (304)869-3404
 F: (304)869-3408