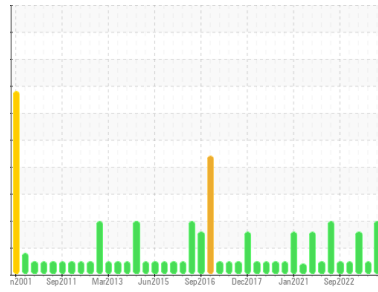


OIL ANALYSIS REPORT

Sample Rating Trend



ISO



Machine Id
EMD 2251

Component
Diesel Engine

Fluid
 DIESEL ENGINE OIL SAE 15W40 (165 GAL)

DIAGNOSIS

Recommendation

We recommend you service the filters on this component. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is a high amount of particulates present 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		ST46278	ST41982	ST45000
Sample Date	Client Info		16 Apr 2024	17 Sep 2023	11 Jul 2023
Machine Age	hrs	Client Info	0	0	0
Oil Age	hrs	Client Info	0	0	0
Oil Changed	Client Info		N/A	N/A	N/A
Sample Status			ABNORMAL	NORMAL	ATTENTION

CONTAMINATION

	method	limit/base	current	history1	history2
Fuel	WC Method	>4	<1.0	<1.0	<1.0
Water	WC Method	>0.20	NEG	NEG	NEG
Glycol	WC Method		NEG	NEG	NEG

WEAR METALS

	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m >100	11	15	17
Chromium	ppm	ASTM D5185m >15	<1	1	<1
Nickel	ppm	ASTM D5185m >5	0	0	0
Titanium	ppm	ASTM D5185m	0	<1	<1
Silver	ppm	ASTM D5185m >2	0	0	0
Aluminum	ppm	ASTM D5185m >10	2	<1	2
Lead	ppm	ASTM D5185m >75	1	3	3
Copper	ppm	ASTM D5185m >90	9	11	11
Tin	ppm	ASTM D5185m >30	1	2	2
Vanadium	ppm	ASTM D5185m	0	<1	<1
Cadmium	ppm	ASTM D5185m	0	<1	0

ADDITIVES

	method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m 250	47	40	44
Barium	ppm	ASTM D5185m 10	0	0	0
Molybdenum	ppm	ASTM D5185m 100	51	46	45
Manganese	ppm	ASTM D5185m	0	<1	<1
Magnesium	ppm	ASTM D5185m 450	22	10	25
Calcium	ppm	ASTM D5185m 3000	3700	3460	3355
Phosphorus	ppm	ASTM D5185m 1150	27	27	38
Zinc	ppm	ASTM D5185m 1350	8	0	24
Sulfur	ppm	ASTM D5185m 4250	2545	2695	2756

CONTAMINANTS

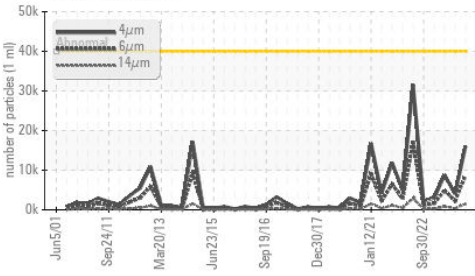
	method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m >17	3	5	3
Sodium	ppm	ASTM D5185m >158	<1	1	2
Potassium	ppm	ASTM D5185m >20	2	2	4

INFRA-RED

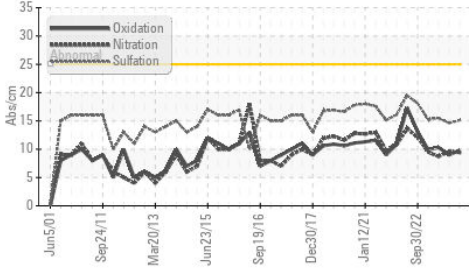
	method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844 >3	0.2	0.2	0.2
Nitration	Abs/cm	*ASTM D7624 >20	9.4	9.6	8.7
Sulfation	Abs./1mm	*ASTM D7415 >30	15.1	14.6	15.5

OIL ANALYSIS REPORT

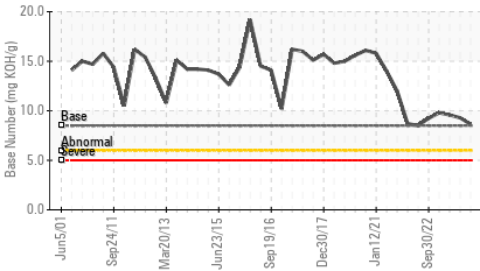
Particle Trend



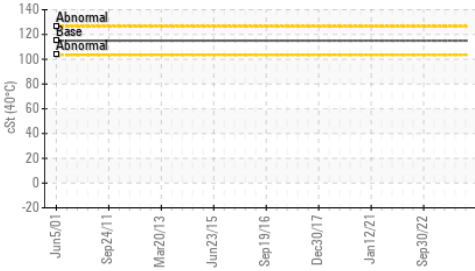
FT-IR (Direct Trend)



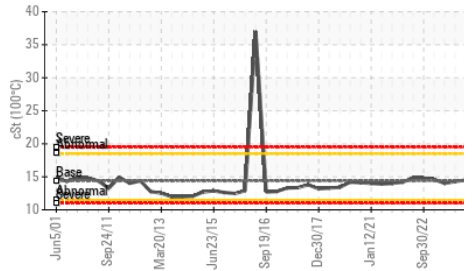
Base Number



Viscosity @ 40°C



Viscosity @ 100°C



FLUID CLEANLINESS	method	limit/base	current	history1	history2
Particles >4µm	ASTM D7647	>40000	16042	4054	8752
Particles >6µm	ASTM D7647	>5000	8739	2208	4868
Particles >14µm	ASTM D7647	>640	1487	376	811
Particles >21µm	ASTM D7647	>160	501	127	273
Particles >38µm	ASTM D7647	>40	77	20	42
Particles >71µm	ASTM D7647	>10	8	2	4
Oil Cleanliness	ISO 4406 (c)	>22/19/16	21/20/18	19/18/16	20/19/17

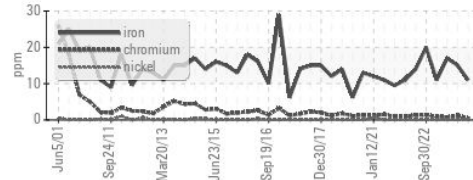
FLUID DEGRADATION	method	limit/base	current	history1	history2	
Oxidation	Abs./1mm	*ASTM D7414	>25	9.8	9.0	10.3
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.62	9.29	9.58

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	>0.20	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

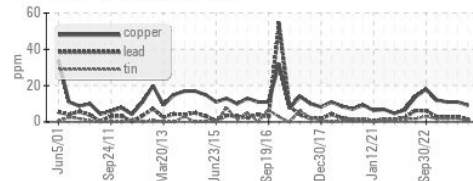
FLUID PROPERTIES	method	limit/base	current	history1	history2	
Visc @ 100°C	cSt	ASTM D445	14.4	14.5	14.3	14.0

GRAPHS

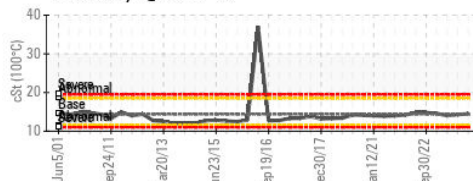
Ferrous Alloys



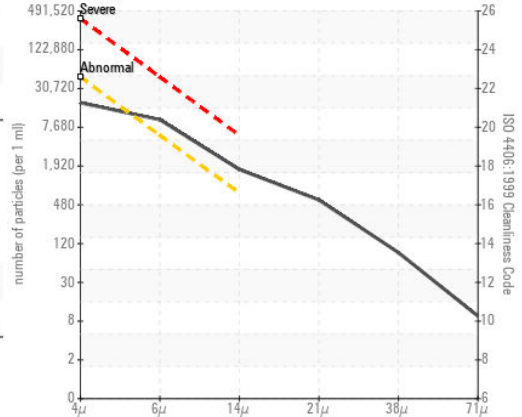
Non-ferrous Metals



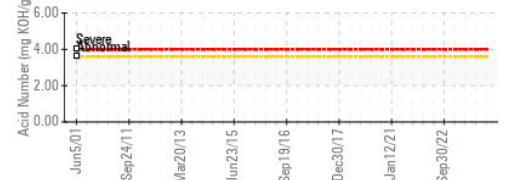
Viscosity @ 100°C



Particle Count



Acid Number



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : ST46278
Lab Number : **06151292**
Unique Number : 10981370
Test Package : IND 2 (Additional Tests: KV40, PrtCount, TAN Man)

NUCOR STEEL-HERTFORD
 PO BOX 279
 WINTON, NC
 US 27986
 Contact: JOHN REUTER
 jreuter@hpsystemsinc.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)

F: (252)356-1369