

Machine Id  
**WESTERN STAR 20 - CAT**  
Component  
**Diesel Engine**  
Fluid  
**FLEETLINE SUPERFLEET XHD 15W40 (10 GAL)**

**RECOMMENDATION**

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		<b>PCA0109962</b>	LP0000859	LP0000495
Sample Date		Client Info		<b>11 May 2024</b>	01 Dec 2023	21 Aug 2023
Machine Age	mls	Client Info		<b>699951</b>	683381	673432
Oil Age	mls	Client Info		<b>0</b>	9240	12347
Filter Age	mls	Client Info		<b>0</b>	9240	12347
Oil Changed		Client Info		<b>Changed</b>	Changed	Changed
Filter Changed		Client Info		<b>Changed</b>	Changed	Changed
Sample Status				<b>ABNORMAL</b>	NORMAL	NORMAL

**WEAR**

Cylinder, crank, or cam shaft wear is indicated.

Iron	ppm	ASTM D5185m	>100	<b>▲ 196</b>	52	60
Chromium	ppm	ASTM D5185m	>20	<b>11</b>	2	2
Nickel	ppm	ASTM D5185m	>2	<b>2</b>	<1	<1
Titanium	ppm	ASTM D5185m	>2	<b>1</b>	<1	<1
Silver	ppm	ASTM D5185m	>2	<b>&lt;1</b>	0	0
Aluminum	ppm	ASTM D5185m	>25	<b>● 13</b>	3	3
Lead	ppm	ASTM D5185m	>40	<b>2</b>	2	5
Copper	ppm	ASTM D5185m	>330	<b>9</b>	5	6
Tin	ppm	ASTM D5185m	>15	<b>1</b>	<1	<1
Vanadium	ppm	ASTM D5185m		<b>&lt;1</b>	0	<1
White Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE

**CONTAMINATION**

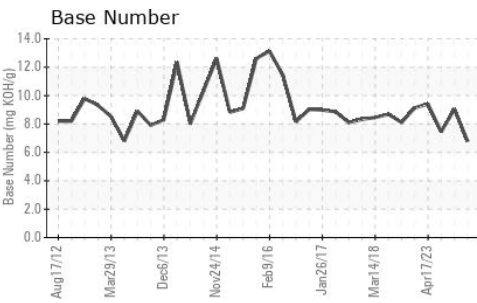
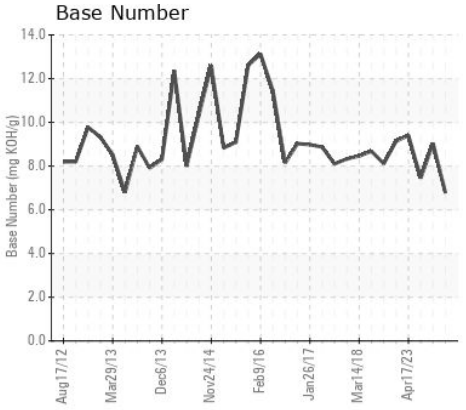
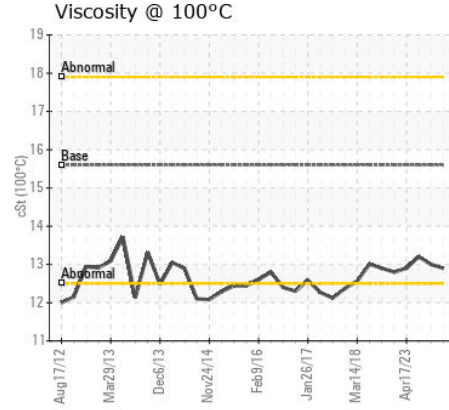
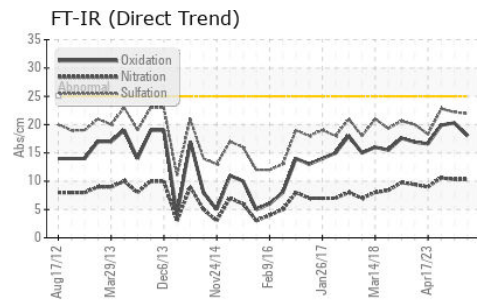
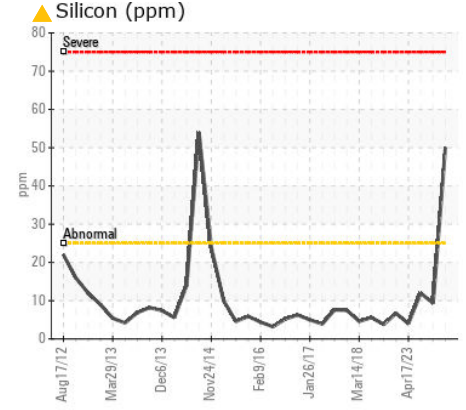
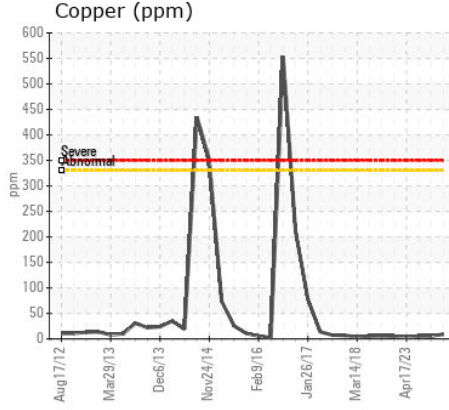
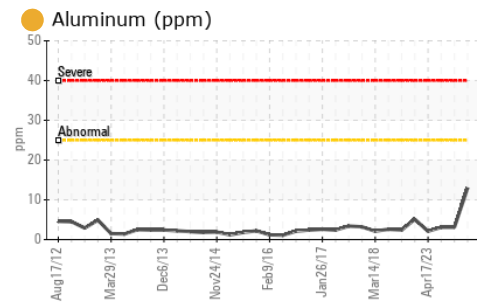
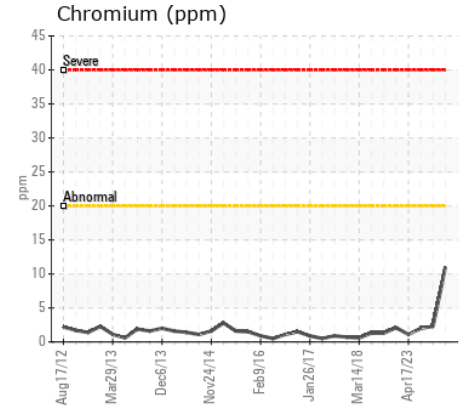
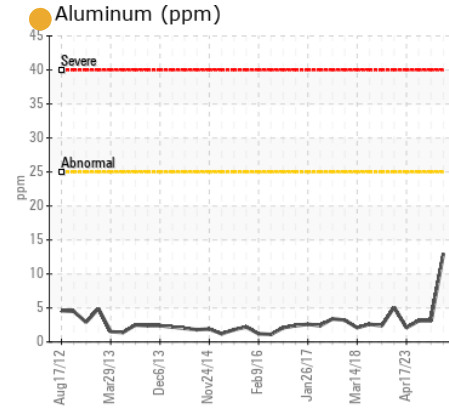
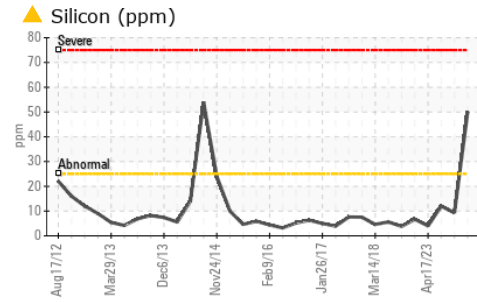
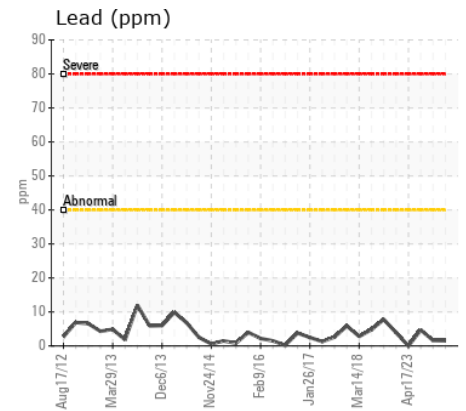
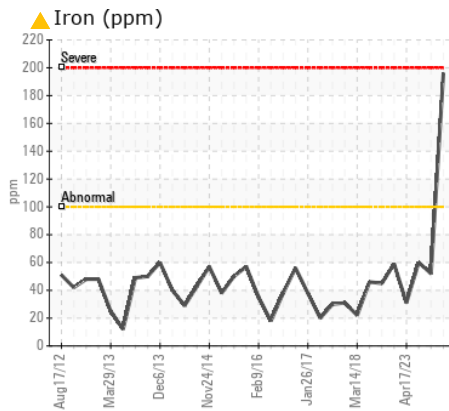
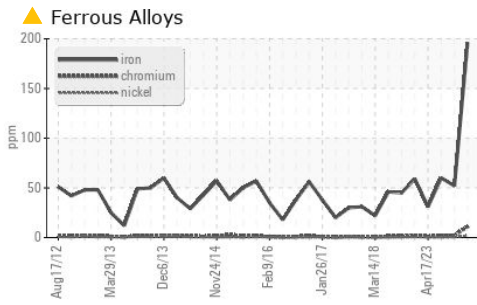
Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress.

Silicon	ppm	ASTM D5185m	>25	<b>▲ 50</b>	9	12
Potassium	ppm	ASTM D5185m	>20	<b>3</b>	2	3
Fuel		WC Method	>5	<b>&lt;1.0</b>	<1.0	<1.0
Water		WC Method	>0.2	<b>NEG</b>	NEG	NEG
Glycol		WC Method		<b>NEG</b>	NEG	NEG
Soot %	%	*ASTM D7844	>3	<b>0.5</b>	0.5	0.7
Nitration	Abs/cm	*ASTM D7624	>20	<b>10.3</b>	10.3	10.6
Sulfation	Abs/.1mm	*ASTM D7415	>30	<b>21.9</b>	22.2	22.8
Silt	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Debris	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	<b>NONE</b>	NONE	NONE
Appearance	scalar	*Visual	NORML	<b>NORML</b>	NORML	NORML
Odor	scalar	*Visual	NORML	<b>NORML</b>	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	<b>NEG</b>	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		<b>6</b>	2	3
Boron	ppm	ASTM D5185m		<b>3</b>	14	13
Barium	ppm	ASTM D5185m		<b>0</b>	0	0
Molybdenum	ppm	ASTM D5185m		<b>25</b>	59	73
Manganese	ppm	ASTM D5185m		<b>3</b>	<1	<1
Magnesium	ppm	ASTM D5185m		<b>139</b>	735	634
Calcium	ppm	ASTM D5185m		<b>2279</b>	1206	1670
Phosphorus	ppm	ASTM D5185m		<b>862</b>	972	1105
Zinc	ppm	ASTM D5185m		<b>1030</b>	1167	1359
Sulfur	ppm	ASTM D5185m		<b>3811</b>	2974	4249
Oxidation	Abs/.1mm	*ASTM D7414	>25	<b>18.0</b>	20.3	19.9
Base Number (BN)	mg KOH/g	ASTM D2896		<b>6.78</b>	9.04	7.45
Visc @ 100°C	cSt	ASTM D445	15.6	<b>12.9</b>	13.0	13.2



Certificate L2367

**Laboratory** : WearCheck USA - 501 Madison Ave., Cary, NC 27513  
**Sample No.** : PCA0109962  
**Lab Number** : 06188256  
**Unique Number** : 11045008  
**Test Package** : MOB 2

**Received** : 22 May 2024  
**Tested** : 24 May 2024  
**Diagnosed** : 24 May 2024 - Sean Felton

**S.M. LORUSSO & SONS**  
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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)