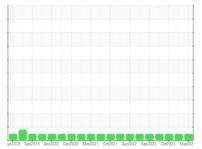


OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Machine Id

WESTERN STAR 16

Diesel Engine

FLEETLINE SUPERFLEET XHD 15W40 (10 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

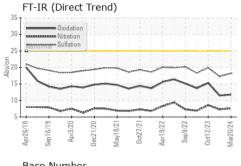
Fluid Condition

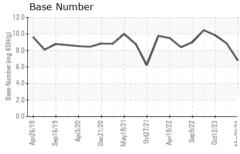
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

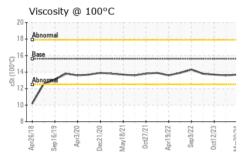
SAMPLE INFORMATION method limit/base current history1 history2	GAL)		iprzu i o Sep zu	9 Aprzuzu Deczuzu Mayz	UZI UCTZUZI APIZUZZ SEPZUZZ UC	tzuza marzuz		
Sample Date	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2	
Machine Age mls Client Info 292216 280763 27165 Oil Age mls Client Info 11453 9211 15817 Oil Changed Client Info Changed Changed Changed Changed Sample Status NoRMAL NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 <1.0 Water WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history2 limitory2 Iron ppm ASTM D5185m >100 9 11 19 Chromium ppm ASTM D5185m >20 1 <1 1 Nickel ppm ASTM D5185m >20 1 <1 1 0 <1 Stiller <1 0 <1 Stiller <1 0	Sample Number		Client Info		PCA0110129	LP0000528	LP0000422	
Oil Age mls Client Info Changed Chan	Sample Date		Client Info		20 Mar 2024	02 Jan 2024	12 Oct 2023	
Changed Sample Status	Machine Age	mls	Client Info		292216	280763	27165	
NORMAL NORMAL NORMAL	Oil Age	mls	Client Info		11453	9211	15817	
NORMAL NORMAL NORMAL	Oil Changed		Client Info		Changed	Changed	Changed	
Fuel	Sample Status				NORMAL	NORMAL	NORMAL	
Water WC Method >0.2 NEG NEG NEG Glycol WC Method Imit/base current history1 history2 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 9 11 19 Chromium ppm ASTM D5185m >20 1 <1 1 Nickel ppm ASTM D5185m >4 <1 0 <1 Silver ppm ASTM D5185m >4 <1 0 <1 Silver ppm ASTM D5185m >40 1 0 <1 Silver ppm ASTM D5185m >40 1 0 <1 Copper ppm ASTM D5185m >15 1 0 <1 Vanadium ppm ASTM D5185m >11 0 <0 Cadmium ppm ASTM D5185m <1 0 <0 Bari	CONTAMINAT	ION	method	limit/base	current	history1	history2	
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0	
WEAR METALS	Water		WC Method	>0.2	NEG	NEG	NEG	
Iron	Glycol		WC Method		NEG	NEG	NEG	
Chromium ppm ASTM D5185m >20 1 <1	WEAR METAL	S	method	limit/base	current	history1	history2	
Nickel	Iron	ppm	ASTM D5185m	>100	9	11	19	
Titanium ppm ASTM D5185m <1	Chromium	ppm	ASTM D5185m	>20	1	<1	1	
Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >20 5 3 9 Lead ppm ASTM D5185m >40 1 0 <1	Nickel	ppm	ASTM D5185m	>4	<1	0	0	
Aluminum	Titanium	ppm	ASTM D5185m		<1	0	<1	
Lead ppm ASTM D5185m >40 1 0 <1	Silver	ppm	ASTM D5185m	>3	0	0	0	
Copper ppm ASTM D5185m >330 2 2 2 2 Tin ppm ASTM D5185m >15 1 0 <1 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 13 10 8 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 31 35 68 Manganese ppm ASTM D5185m -1 0 -1 Magnesium ppm ASTM D5185m 2025 1749 1366 Phosphorus ppm ASTM D5185m 922 879 1105 Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 26	Aluminum	ppm	ASTM D5185m	>20	5	3	9	
Tin ppm ASTM D5185m >15 1 0 <1	Lead	ppm	ASTM D5185m	>40	1	0	<1	
Vanadium ppm ASTM D5185m <1	Copper	ppm	ASTM D5185m	>330	2	2	2	
Cadmium ppm ASTM D5185m <1	Tin	ppm	ASTM D5185m	>15	1	0	<1	
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 13 10 8 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 31 35 68 Manganese ppm ASTM D5185m -1 0 -1 Magnesium ppm ASTM D5185m 141 384 963 Calcium ppm ASTM D5185m 2025 1749 1366 Phosphorus ppm ASTM D5185m 922 879 1105 Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m 20 4	Vanadium	ppm	ASTM D5185m		<1	0	0	
Boron	Cadmium	ppm	ASTM D5185m		<1	0	0	
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 31 35 68 Manganese ppm ASTM D5185m <1 0 <1 Magnesium ppm ASTM D5185m 141 384 963 Calcium ppm ASTM D5185m 2025 1749 1366 Phosphorus ppm ASTM D5185m 922 879 1105 Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 22 0 1 Potassium ppm ASTM D5185m 20 4 7 9 INFRA-RED method limit/base	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum ppm ASTM D5185m 31 35 68 Manganese ppm ASTM D5185m <1	Boron	ppm	ASTM D5185m		13	10	8	
Manganese ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m		0	0	0	
Magnesium ppm ASTM D5185m 141 384 963 Calcium ppm ASTM D5185m 2025 1749 1366 Phosphorus ppm ASTM D5185m 922 879 1105 Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/:mm *ASTM D7415 >30 18.2 17.3 19.9 <td colsp<="" th=""><th>Molybdenum</th><th>ppm</th><th>ASTM D5185m</th><th></th><th>31</th><th>35</th><th>68</th></td>	<th>Molybdenum</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>31</th> <th>35</th> <th>68</th>	Molybdenum	ppm	ASTM D5185m		31	35	68
Calcium ppm ASTM D5185m 2025 1749 1366 Phosphorus ppm ASTM D5185m 922 879 1105 Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 <td< th=""><th>Manganese</th><th>ppm</th><th>ASTM D5185m</th><th></th><th><1</th><th>0</th><th><1</th></td<>	Manganese	ppm	ASTM D5185m		<1	0	<1	
Phosphorus ppm ASTM D5185m 922 879 1105 Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 hi	Magnesium	ppm	ASTM D5185m		141	384	963	
Zinc ppm ASTM D5185m 1076 1077 1563 Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8	Calcium	ppm	ASTM D5185m		2025	1749	1366	
Sulfur ppm ASTM D5185m 3690 3138 3699 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Phosphorus	ppm	ASTM D5185m		922	879	1105	
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Zinc	ppm	ASTM D5185m		1076	1077	1563	
Silicon ppm ASTM D5185m >25 4 4 4 4 Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Sulfur	ppm	ASTM D5185m		3690	3138	3699	
Sodium ppm ASTM D5185m 2 0 1 Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	CONTAMINAN	TS	method	limit/base	current	history1	history2	
Potassium ppm ASTM D5185m >20 4 7 9 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Silicon	ppm	ASTM D5185m	>25	4	4	4	
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Sodium	ppm	ASTM D5185m		2	0	1	
Soot % % *ASTM D7844 >3 0.3 0.3 0.6 Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Potassium	ppm	ASTM D5185m	>20	4	7	9	
Nitration Abs/cm *ASTM D7624 >20 7.6 7.3 8.6 Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	INFRA-RED		method	limit/base	current	history1	history2	
Sulfation Abs/.1mm *ASTM D7415 >30 18.2 17.3 19.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Soot %	%	*ASTM D7844	>3	0.3	0.3	0.6	
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Nitration	Abs/cm	*ASTM D7624	>20	7.6	7.3	8.6	
Oxidation Abs/.1mm *ASTM D7414 >25 11.8 11.5 15.3	Sulfation	Abs/.1mm	*ASTM D7415	>30	18.2	17.3	19.9	
	FLUID DEGRA	OATION	method	limit/base	current	history1	history2	
Base Number (BN) mg KOH/g ASTM D2896 6.78 8.87 9.85	Oxidation	Abs/.1mm	*ASTM D7414	>25	11.8	11.5	15.3	
	Base Number (BN)	mg KOH/g	ASTM D2896		6.78	8.87	9.85	



OIL ANALYSIS REPORT







VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	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	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

FLUID PROP	ERITES	method	ilmit/base		nistory i	nistoryz
Visc @ 100°C	cSt	ASTM D445	15.6	13.7	13.6	13.7

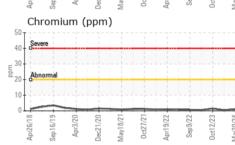
100

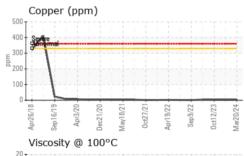
Lead (ppm)

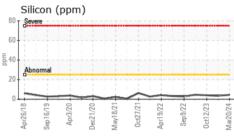
Seve	re	1	1 1				1		
Abn	ormal								
-									
ليا	19	102	0.2	21	21	22	22	23	24
Apr26/18	Sep16/19 +	Apr3/20 -	Dec21/20	May18/21	0ct27/21	Apr19/22	Sep9/22	Oct12/23	Mar20/24

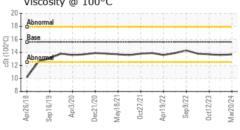
GRAPHS

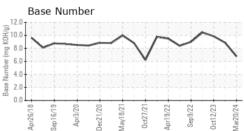
40















Certificate 12367

Laboratory

Sample No. Lab Number : 06135745 Unique Number : 10955210

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0110129

Received **Tested**

: 01 Apr 2024 : 03 Apr 2024

Diagnosed : 04 Apr 2024 - Sean Felton S.M. LORUSSO & SONS 221 NORFOLK ST. WALPOLE, MA US 02081

Contact: PAUL BECKMAN pbeckman@smlorusso.com T: (508)668-2603

Test Package : MOB 2 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: (508)660-0232