

OIL ANALYSIS REPORT

Sample Rating Trend



Area MIDLAND Machine Id WESTERN STAR 123 Component

Diesel Engine Fluid CHEVRON 15W40 (--- GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable.

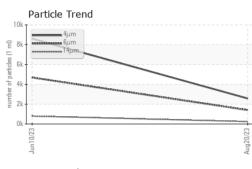
Fluid Condition

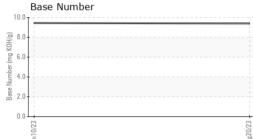
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

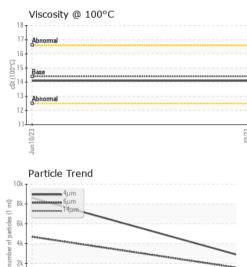
SAMPLE INFORMATION method imit/base current history1 history2 Sample Number Client Info 20 Aug 2023 10 Jun 2023 Sample Date Client Info 20 Aug 2023 10 Jun 2023 Machine Age mits Client Info 0 0 Oil Age mits Client Info N/A N/A CONTAMINATION method imit/base current history1 history2 Fuel WC Method >5 <1.0 CONTAMINATION method imit/base current history1 history2 Fuel WC Method >5 <1.0 WEAR METALS method imit/base current history1 history2 Iron ppm ASTM 05185m >100 9 8 COntromium ppm ASTM 05185m >20 <1 0 Intatium							
Sample Date Cilient Info 20 Aug 2023 10 Jun 2023 Machine Age mils Cilient Info 249004 19605 Oil Age mils Cilient Info 0 0 Oil Changed Cilient Info N/A N/A Sample Status Imit/base current History1 History2 Fuel WC Method >5 <1.0 <1.0 Glycol Imit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 WEAR METALS method imit/base current history1 history2 Iron ppm ASTM D5185m >100 9 8 Itanium ppm ASTM D5185m >20 <1 0 Itanium ppm ASTM D5185m >20 2 <1 Itanium ppm ASTM D5185m >30 0	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age mls Client Info 249004 19605 Oil Age mls Client Info 0 0 Oil Changed Client Info N/A N/A Sample Status Imit/base NORMAL ATTENTION CONTAMINATION method Imit/base current history1 history2 Golycol WC Method >5 <1.0 <1.0 Glycol WC Method >5 <1.0 <1.0 WEAR METALS method Imit/base current history1 history2 Iron ppm ASTM D5185m<>20 <1 0 Nickel ppm ASTM D5185m<>3 0 0 Aluminum ppm ASTM D5185m<>40 <1 0 Silver ppm ASTM D5185m<>30 <1 -1 Copper ppm ASTM D5185m 395 3911	Sample Number		Client Info		KL0012205	KL0012445	
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Oil Changed Sample Status Client Info N/A N/A ATTENTION	Machine Age	mls	Client Info		249004	19605	
Sample Status NORMAL ATTENTION CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 Glycol WC Method >5 <1.0 <1.0 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 9 8 Nickel ppm ASTM D5185m >20 <1 0 Nickel ppm ASTM D5185m >20 2 <1 Aluminum ppm ASTM D5185m >20 2 <1 Lead ppm ASTM D5185m >20 2 <1 Vanadium ppm ASTM D5185m >15 0 Cadmium ppm ASTM D5185m 0 0 Standbidenum <th>Oil Age</th> <th>mls</th> <th>Client Info</th> <th></th> <th>0</th> <th>0</th> <th></th>	Oil Age	mls	Client Info		0	0	
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 Glycol WC Method NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 9 8 Chromium ppm ASTM D5185m >20 <1 0 Nickel ppm ASTM D5185m >20 2 <1 Silver ppm ASTM D5185m >20 2 <1 Lead ppm ASTM D5185m >20 2 <1 Copper ppm ASTM D5185m >330 <1 <1 Cadmium ppm ASTM D5185m 0 0 ADDITIVES method limit/base current history1 history2 <th>Oil Changed</th> <th></th> <th>Client Info</th> <th></th> <th>N/A</th> <th>N/A</th> <th></th>	Oil Changed		Client Info		N/A	N/A	
Fuel WC Method >5 <1.0	Sample Status				NORMAL	ATTENTION	
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WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 9 8 Chromium ppm ASTM D5185m >20 <1 0 Nickel ppm ASTM D5185m >20 <1 0 Titanium ppm ASTM D5185m >3 0 0 Silver ppm ASTM D5185m >40 <1 0 Lead ppm ASTM D5185m >20 2 <1 Copper ppm ASTM D5185m >30 0 0 Vanadium ppm ASTM D5185m >30 0 0 Vanadium ppm ASTM D5185m 0 0 Cadmium ppm ASTM D5185m 0 0 Boron ppm ASTM D5185m 395	Fuel		WC Method	>5	<1.0	<1.0	
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Chromium ppm ASTM D5185m >20 <1	WEAR METALS		method	limit/base	current	history1	history2
Chromium ppm ASTM D5185m >20 <1 0 Nickel ppm ASTM D5185m >4 <1	Iron	ppm	ASTM D5185m	>100	9	8	
Titanium ppm ASTM D5185m 0 0 Silver ppm ASTM D5185m >3 0 0 Aluminum ppm ASTM D5185m >20 2 <1	Chromium		ASTM D5185m	>20	<1	0	
Silver ppm ASTM D5185m >3 0 0 Aluminum ppm ASTM D5185m >20 2 <1 Lead ppm ASTM D5185m >40 <1 0 Copper ppm ASTM D5185m >330 <1 <1 Tin ppm ASTM D5185m >15 0 0 Vanadium ppm ASTM D5185m >15 0 0 Cadmium ppm ASTM D5185m 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 395 391 Magnaese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 406 436 Sulfur ppm ASTM D5185m 854 829	Nickel	ppm	ASTM D5185m	>4	<1	0	
Aluminum ppm ASTM D5185m >20 2 <1 Lead ppm ASTM D5185m >40 <1	Titanium	ppm	ASTM D5185m		0	0	
Lead ppm ASTM D5185m >40 <1 0 Copper ppm ASTM D5185m >330 <1	Silver	ppm	ASTM D5185m	>3	0	0	
Copper ppm ASTM D5185m >330 <1 <1 Tin ppm ASTM D5185m >15 0 0 Vanadium ppm ASTM D5185m >15 0 0 Cadmium ppm ASTM D5185m 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 395 391 Barium ppm ASTM D5185m 92 87 Maganese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 1432 1515 Sulfur ppm ASTM D5185m 25 1 6 Sulfur ppm ASTM D	Aluminum	ppm	ASTM D5185m	>20	2	<1	
Tin ppm ASTM D5185m >15 0 0 Vanadium ppm ASTM D5185m 0 0 Cadmium ppm ASTM D5185m 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 395 391 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 92 87 Manganese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 9406 436 Calcium ppm ASTM D5185m 854 829 Sulfur ppm ASTM D5185m 25 1 6 Sulfur ppm ASTM D5185m >20 2 2 Sodium ppm ASTM D5185m<	Lead	ppm	ASTM D5185m	>40	<1	0	
Vanadium ppm ASTM D5185m 0 <1 Cadmium ppm ASTM D5185m 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 395 391 Barium ppm ASTM D5185m 395 391 Molybdenum ppm ASTM D5185m 0 0 0 Manganese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 406 436 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 406 436 Sulfur ppm ASTM D5185m 1432 1515 Sulfur ppm ASTM D5185m 854 829 Sulfur ppm ASTM D5185m 20 1 </td <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>330</td> <th><1</th> <td><1</td> <td></td>	Copper	ppm	ASTM D5185m	>330	<1	<1	
Cadmium ppm ASTM D5185m 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 395 391 Barium ppm ASTM D5185m 0 0 Molybdenum ppm ASTM D5185m 92 87 Manganese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 406 436 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 854 829 Sulfur ppm ASTM D5185m 4661 4941 Sulfur ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2	Tin	ppm	ASTM D5185m	>15	0	0	
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m395391BariumppmASTM D5185m00MolybdenumppmASTM D5185m9287ManganeseppmASTM D5185m9287MagnesiumppmASTM D5185m406436CalciumppmASTM D5185m406436CalciumppmASTM D5185m14321515PhosphorusppmASTM D5185m854829ZincppmASTM D5185m46614941SulfurppmASTM D5185m46614941SulfurppmASTM D5185m>2516SodiumppmASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>30.10.1NitrationAbs/cm*ASTM D7624>204.85.0	Vanadium	ppm	ASTM D5185m		0	<1	
Boron ppm ASTM D5185m 395 391 Barium ppm ASTM D5185m 0 0 Molybdenum ppm ASTM D5185m 92 87 Manganese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 406 436 Phosphorus ppm ASTM D5185m 854 829 Zinc ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m >25 1 6 Solicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base c	Cadmium	ppm	ASTM D5185m		0	0	
Barium ppm ASTM D5185m 0 0 Molybdenum ppm ASTM D5185m 92 87 Manganese ppm ASTM D5185m 92 87 Magnesium ppm ASTM D5185m <1 <1 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 406 436 Phosphorus ppm ASTM D5185m 1432 1515 Zinc ppm ASTM D5185m 854 829 Sulfur ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2 2 Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 92 87 Manganese ppm ASTM D5185m <1 <1 < Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 1432 1515 Phosphorus ppm ASTM D5185m 854 829 Zinc ppm ASTM D5185m 4661 4941 Sulfur ppm ASTM D5185m >25 1 6 Solicon ppm ASTM D5185m >25 1 6 Solium ppm ASTM D5185m >50 0 <11 Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % %	Boron	ppm	ASTM D5185m		395	391	
Manganese ppm ASTM D5185m <1 <1 Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 1432 1515 Calcium ppm ASTM D5185m 854 829 Zinc ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m 4661 4941 Sulfur ppm ASTM D5185m >25 1 6 Solicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Barium	ppm	ASTM D5185m		0	0	
Magnesium ppm ASTM D5185m 406 436 Calcium ppm ASTM D5185m 1432 1515 Phosphorus ppm ASTM D5185m 854 829 Zinc ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m 4661 4941 Sulfur ppm ASTM D5185m >25 1 6 Solicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Molybdenum	ppm	ASTM D5185m		92	87	
Calcium ppm ASTM D5185m 1432 1515 Phosphorus ppm ASTM D5185m 854 829 Zinc ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m 4661 4941 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2 2 Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Manganese	ppm	ASTM D5185m		<1	<1	
Phosphorus ppm ASTM D5185m 854 829 Zinc ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m 4661 4941 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >20 2 2 Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Magnesium	ppm	ASTM D5185m		406	436	
Zinc ppm ASTM D5185m 1050 1067 Sulfur ppm ASTM D5185m 4661 4941 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >50 0 <1	Calcium	ppm	ASTM D5185m		1432	1515	
Sulfur ppm ASTM D5185m 4661 4941 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >50 0 <1 Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Phosphorus	ppm	ASTM D5185m		854	829	
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >50 0 <1	-	ppm	ASTM D5185m		1050		
Silicon ppm ASTM D5185m >25 1 6 Sodium ppm ASTM D5185m >50 0 <1 Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Sulfur	ppm	ASTM D5185m		4661	4941	
Sodium ppm ASTM D5185m >50 0 <1	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 2 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Silicon	ppm	ASTM D5185m	>25	1	6	
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0		ppm	ASTM D5185m	>50	0		
Soot % % *ASTM D7844 >3 0.1 0.1 Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	Potassium	ppm	ASTM D5185m	>20	2	2	
Nitration Abs/cm *ASTM D7624 >20 4.8 5.0	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	*ASTM D7844	>3	0.1	0.1	
Sulfation Abs/.1mm *ASTM D7415 >30 20.7 21.3	Nitration	Abs/cm	*ASTM D7624	>20	4.8	5.0	
	Sulfation	Abs/.1mm	*ASTM D7415	>30	20.7	21.3	



OIL ANALYSIS REPORT







FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		2575	8604	
Particles >6µm		ASTM D7647	>5000	1403	4687	
Particles >14µm		ASTM D7647	>640	239	A 798	
Particles >21µm		ASTM D7647	>160	80	 269	
Particles >38µm		ASTM D7647	>40	12	41	
Particles >71µm		ASTM D7647	>10	1	4	
Oil Cleanliness		ISO 4406 (c)	>19/16	18/15	▲ 19/17	
FLUID DEGRADA	ATION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	14.4	14.6	
Base Number (BN)	mg KOH/g	ASTM D2896		9.38	9.44	
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	
Precipitate	scalar	*Visual	NONE	NONE	NONE	
Silt	scalar	*Visual	NONE	NONE	NONE	
Debris	scalar	*Visual	NONE	NONE	NONE	
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	
Appearance	scalar	*Visual	NORML	NORML	NORML	
Odor	scalar	*Visual	NORML	NORML	NORML	
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	
Free Water	scalar	*Visual		NEG	NEG	
FLUID PROPERT	TIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	14.1	14.1	
GRAPHS						
Ferrous Alloys			491,520	Particle Cour	ıt	т26
iron			122,880			-24
5 - nickel						
			30,720			-22
53			€ ^{7,680}		*	-20
Jun 10/23			Aug20/23 s (per 1 ml			-18
¬ Non-ferrous Metal	s		¥ <u>sa</u> ⊒⊒ 480		2	-16
0 T			to 120			
copper			- agu			-20 -18 -16 -14 -12
5 - tin			₹ 30			12
0			8	Sievene mal		10
Jun 10/23			Aug20/23 .	-		

KOH/g) 10.

(ma

Base ¹ 0.0

Aug20/23 -

: 21 Aug 2023

: 22 Aug 2023

5. Number

Jun10/23

Base Number

n. Jun10/23

> Unique Number : 10615142 Diagnostician : Wes Davis Test Package : MOB 2 (Additional Tests: PrtCount) Certificate L2367 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)

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

Received

Diagnosed

Viscosity @ 100°C

Abno 16 ن

: KL0012205

: 05929871

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Laboratory

Sample No.

Lab Number

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Contact/Location: ABEL SALAZAR - SALMID

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SALAZAR TRUCKING CORP

Contact: ABEL SALAZAR

abel@salazarservice.com

4500 E TX 158

MIDLAND, TX

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US 76706

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