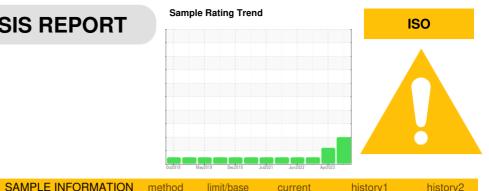


OIL ANALYSIS REPORT



FREIGHTLINER 35139 Component

Diesel Engine Elui DIESEL ENGINE OIL SAE 15W40 (--- QTS)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. The filter change at the time of sampling has been noted. 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.

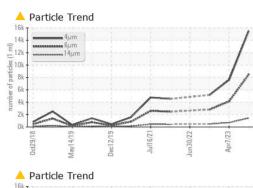
Fluid Condition

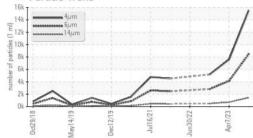
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

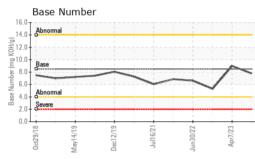
Sample NumberClient InfoKL0012038KLM2339292KL0010011Sample DateIClient Info28 Jul 202307 Apr 202303 Nov 2022Machine AgemisClient Info223960221907219080Oil AgeMisClient InfoN/AN/AN/ASample StatusIClient InfoN/AN/AN/ASample StatusIClient InfoN/AN/AN/ACONTAMINATIOVTentonNethodSamo<1.0Nistory1FuelWC MethodSa<1.0Nistory1Nistory2FuelWC MethodSa<1.0Nistory1Nistory1GlycolIMC MothodSa<1.0<1.0Nistory1InonppmASTM D5155S51816<1.0<1.0ChromiumppmASTM D5155S51816<1.0<1.0NickelppmASTM D5155S20<1.1<1.1NickelppmASTM D5155S20<1.1<1.1AuminumppmASTM D5155S33333LeadppmASTM D5155S43333LeadppmASTM D5155S43333LeadppmASTM D5155S43333LoreppmASTM D5155S43333LoreppmASTM D5155S4	SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Machine AgemlsClient Info223960221927219580Oil AgemlsClient Info000Oil ChangedClient InfoN/AN/AN/ASample StatusImageclient InfoABNORMALATTENTIONNORMALCONTAMINATIONmethodlimit/basecurrenthistory1history2FuelWC Method>3.0<1.0<1.0<1.0GlycolWC Method>3.0<1.0<1.0<1.0MEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTM D5185m>552<1<1NickelppmASTM D5185m>55<1<1<1SilverppmASTM D5185m>55<1<1<1AluminumppmASTM D5185m>553333LeadppmASTM D5185m>55<1<1<1<1AluminumppmASTM D5185m>5533333LeadppmASTM D5185m>1000000CopperppmASTM D5185m>5031<144BariumppmASTM D5185m10000000AdminumppmASTM D5185m10000000AdminumppmASTM D5185m114<1<11VanadiumppmASTM D51	Sample Number		Client Info		KL0012038	KLM2339292	KL0010011
Oil Age mls Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status Image Client Info N/A ABNORMAL ATTENTION NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	Sample Date		Client Info		28 Jul 2023	07 Apr 2023	03 Nov 2022
Oil Age mis Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status Image Image current history1 history2 Fuel WC Method >3.0 <1.0	Machine Age	mls	Client Info		223960	221927	219580
Oil Changed Sample StatusClient InfoN/AN/AN/AN/ASample StatusImit InfoABNORMALATTENTIONNORMALCONTAMINATIONmethodImit/basecurrenthistory1history2FuelWC Method>3.0<1.0	Oil Age	mls	Client Info		0	0	0
Sample StatusImatheABNORMALATTENTIONNORMALCONTAMINATIONmethodlimit/basecurrenthistory1history2FuelWC Method>3.0<1.0	-		Client Info			N/A	N/A
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0	-				ABNORMAL	ATTENTION	NORMAL
Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Glycol WC Method WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >56 58 18 16 Chromium ppm ASTM D5185m >3 0 <1 <1 Nickel ppm ASTM D5185m >3 0 <1 <1 Silver ppm ASTM D5185m >2 0 0 <1 <1 Lead ppm ASTM D5185m >10 0 0 2 Copper ppm ASTM D5185m >180 3 7 6 Tin ppm ASTM D5185m 0 0 0 0 0 Cadmium ppm ASTM D5185m 180 3 11 1 4 Barium ppm ASTM D5185m 10	CONTAMINATION		method	limit/base	current	historv1	historv2
Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >65 58 18 16 Chromium ppm ASTM D5185m >5 2 <1			WC Method		~10		
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >65 58 18 16 Chromium ppm ASTM D5185m >5 2 <1				20.0			
Iron ppm ASTM D5185m >65 58 18 16 Chromium ppm ASTM D5185m >5 2 <1	,						
Chromium ppm ASTM D5185m >5 2 <1 <1 Nickel ppm ASTM D5185m >3 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >3 0 <1 <1 Titanium ppm ASTM D5185m >5 <1	Iron	ppm	ASTM D5185m	>65	58	18	16
Titanium ppm ASTM D5185m >5 <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 <1	Chromium	ppm	ASTM D5185m	>5	2	<1	<1
Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >35 3 3 3 Lead ppm ASTM D5185m >10 0 0 2 Copper ppm ASTM D5185m >180 3 7 6 Tin ppm ASTM D5185m >8 <1	Nickel	ppm	ASTM D5185m	>3	0	<1	<1
Aluminum ppm ASTM D5185m >35 3 3 3 Lead ppm ASTM D5185m >10 0 0 2 Copper ppm ASTM D5185m >180 3 7 6 Tin ppm ASTM D5185m >8 <1	Titanium	ppm	ASTM D5185m	>5	<1	<1	<1
LeadppmASTM D5185m>10002CopperppmASTM D5185m>180376TinppmASTM D5185m>8<1	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >180 3 7 6 Tin ppm ASTM D5185m >8 <1	Aluminum	ppm	ASTM D5185m	>35	3	3	3
Tin ppm ASTM D5185m >8 <1 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 31 <1	Lead	ppm	ASTM D5185m	>10	0	0	2
Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 31 <1 4 Barium ppm ASTM D5185m 10 0 0 0 Molybdenum ppm ASTM D5185m 10 0 0 0 Magnesiem ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 1147 89 87 Calcium ppm ASTM D5185m 150 11425 1134 1147 Sulfur ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 215 9 <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>180</td> <th>3</th> <td>7</td> <td>6</td>	Copper	ppm	ASTM D5185m	>180	3	7	6
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 31 <1 4 Barium ppm ASTM D5185m 10 0 0 0 Molybdenum ppm ASTM D5185m 100 70 6 6 Manganese ppm ASTM D5185m 100 70 6 6 Manganesium ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 71 <1< <1 Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 1150 1125 884 870 Sulfur ppm ASTM D5185m 250 9	Tin	ppm	ASTM D5185m	>8	<1	<1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 31 <1	Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 250 31 <1 4 Barium ppm ASTM D5185m 10 0 0 0 Molybdenum ppm ASTM D5185m 100 70 6 6 Manganese ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 71 89 87 Calcium ppm ASTM D5185m 450 1147 89 87 Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 1150 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 1350 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Solium ppm ASTM D5185m>15	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 10 0 0 0 Molybdenum ppm ASTM D5185m 100 70 6 6 Manganese ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 100 70 6 6 Calcium ppm ASTM D5185m 450 1147 89 87 Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 1150 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 1350 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Solicon ppm ASTM D5185m <	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 100 70 6 6 Manganese ppm ASTM D5185m 100 70 6 6 Magnesium ppm ASTM D5185m 450 1147 89 87 Calcium ppm ASTM D5185m 450 1147 89 87 Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 1150 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base	Boron	ppm	ASTM D5185m	250	31	<1	4
Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 450 1147 89 87 Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 3000 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20	Barium	ppm	ASTM D5185m	10	0	0	0
Magnesium ppm ASTM D5185m 450 1147 89 87 Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 1150 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624	Molybdenum	ppm	ASTM D5185m	100	70	6	6
Calcium ppm ASTM D5185m 3000 1300 2351 2405 Phosphorus ppm ASTM D5185m 1150 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 1150 1125 884 870 Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Magnesium	ppm	ASTM D5185m	450	1147	89	87
Zinc ppm ASTM D5185m 1350 1425 1134 1147 Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Calcium	ppm	ASTM D5185m	3000	1300	2351	2405
Sulfur ppm ASTM D5185m 4250 4245 4020 3738 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Phosphorus	ppm	ASTM D5185m	1150	1125	884	870
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Zinc	ppm	ASTM D5185m	1350	1425	1134	1147
Silicon ppm ASTM D5185m >15 9 10 8 Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Sulfur	ppm	ASTM D5185m	4250	4245	4020	3738
Sodium ppm ASTM D5185m >158 9 6 5 Potassium ppm ASTM D5185m >20 5 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 5 5 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Silicon	ppm	ASTM D5185m	>15	9	10	8
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	Sodium	ppm	ASTM D5185m	>158	9	6	5
Soot % * ASTM D7844 >3 1 0.7 0.7 Nitration Abs/cm * ASTM D7624 >20 11.8 9.5 9.9	Potassium	ppm	ASTM D5185m	>20	5	5	5
Nitration Abs/cm *ASTM D7624 >20 11.8 9.5 9.9	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	*ASTM D7844	>3	1	0.7	0.7
	Nitration	Abs/cm	*ASTM D7624	>20	11.8	9.5	9.9
	Sulfation	Abs/.1mm	*ASTM D7415	>30	28.0	24.1	24.9

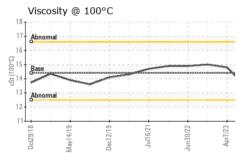


OIL ANALYSIS REPORT



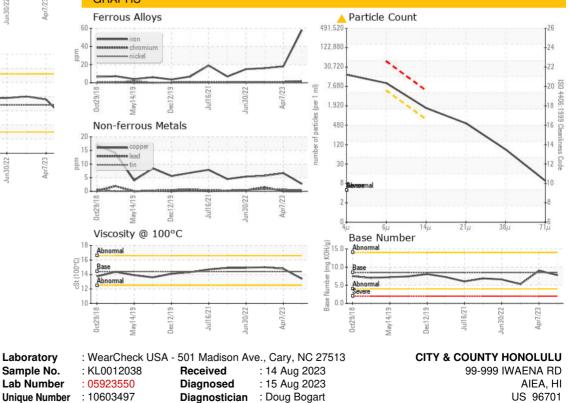






FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647		15503	7595	5170
Particles >6µm		ASTM D7647	>5000	<u> </u>	4137	2816
Particles >14µm		ASTM D7647	>640	 1437	~ 704	479
Particles >21µm		ASTM D7647	>160	<mark>人</mark> 484	2 37	161
Particles >38µm		ASTM D7647	>40	🔺 75	37	25
Particles >71µm		ASTM D7647	>10	8	4	3
Oil Cleanliness		ISO 4406 (c)	>19/16	 20/18	1 9/17	19/16
FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	28.9	15.2	15.6
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	7.78	8.98	5.28
VISUAL		method	limit/base	current	history1	history2
		mounou	innit base	Current	Thistory I	matoryz
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
	scalar scalar					
White Metal		*Visual	NONE	NONE	NONE	NONE
White Metal Yellow Metal	scalar	*Visual *Visual	NONE NONE	NONE NONE	NONE	NONE NONE
White Metal Yellow Metal Precipitate	scalar scalar	*Visual *Visual *Visual	NONE NONE NONE	NONE NONE NONE	NONE NONE NONE	NONE NONE NONE
White Metal Yellow Metal Precipitate Silt	scalar scalar scalar	*Visual *Visual *Visual *Visual	NONE NONE NONE NONE	NONE NONE NONE NONE	NONE NONE NONE NONE	NONE NONE NONE NONE
White Metal Yellow Metal Precipitate Silt Debris	scalar scalar scalar scalar	*Visual *Visual *Visual *Visual *Visual	NONE NONE NONE NONE NONE	NONE NONE NONE NONE NONE	NONE NONE NONE NONE	NONE NONE NONE NONE NONE
White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt	scalar scalar scalar scalar scalar	*Visual *Visual *Visual *Visual *Visual	NONE NONE NONE NONE NONE	NONE NONE NONE NONE NONE	NONE NONE NONE NONE NONE	NONE NONE NONE NONE NONE
White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance	scalar scalar scalar scalar scalar scalar	*Visual *Visual *Visual *Visual *Visual *Visual *Visual	NONE NONE NONE NONE NONE NORML	NONE NONE NONE NONE NONE NONE NORML	NONE NONE NONE NONE NONE NORE	NONE NONE NONE NONE NONE NORML
White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance Odor	scalar scalar scalar scalar scalar scalar scalar	*Visual *Visual *Visual *Visual *Visual *Visual *Visual	NONE NONE NONE NONE NONE NORML NORML	NONE NONE NONE NONE NONE NONE NORML	NONE NONE NONE NONE NONE NORML NORML	NONE NONE NONE NONE NONE NORML NORML
White Metal Yellow Metal Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water	scalar scalar scalar scalar scalar scalar scalar scalar scalar	*Visual *Visual *Visual *Visual *Visual *Visual *Visual *Visual	NONE NONE NONE NONE NONE NORML NORML	NONE NONE NONE NONE NONE NORML NORML NEG	NONE NONE NONE NONE NORML NORML NEG	NONE NONE NONE NONE NONE NORML NORML NEG





US 96701 Contact: CLYDE OMIJA comija@honolulu.gov T: (575)623-9952 F:



Laboratory

Sample No.

Lab Number

Contact/Location: CLYDE OMIJA - CITAIE