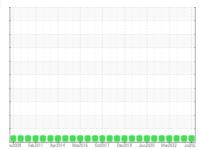


OIL ANALYSIS REPORT

Sample Rating Trend







FREIGHTLINER 237

Component

Diesel Engine

DIESEL ENGINE OIL SAE 15W40 (26 QTS)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil

Fluid Condition

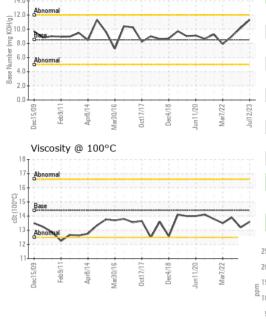
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

sc2009 Feb2011 Apr2014 Mar2016 Occ2017 Dec2018 Jun2020 Mar2022 Jul202							
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2	
Sample Number		Client Info		RW0004292	RW0003889	RW0003944	
Sample Date		Client Info		12 Jul 2023	21 Mar 2023	03 Nov 2022	
Machine Age	hrs	Client Info		2468	2372	2130	
Oil Age	hrs	Client Info		96	242	164	
Oil Changed		Client Info		Changed	Changed	Changed	
Sample Status				NORMAL	NORMAL	NORMAL	
CONTAMINATIO	N	method	limit/base	current	history1	history2	
Fuel		WC Method	>5	<1.0	<1.0	<1.0	
Glycol		WC Method		NEG	NEG	NEG	
WEAR METALS		method	limit/base	current	history1	history2	
Iron	ppm	ASTM D5185m	>100	10	18	14	
Chromium	ppm	ASTM D5185m	>20	<1	0	<1	
Nickel	ppm	ASTM D5185m	>2	0	0	0	
Titanium	ppm	ASTM D5185m	>2	0	0	0	
Silver	ppm	ASTM D5185m	>2	0	0	<1	
Aluminum	ppm	ASTM D5185m	>25	1	2	5	
Lead	ppm	ASTM D5185m	>40	0	0	<1	
Copper	ppm	ASTM D5185m	>330	2	8	13	
Tin	ppm	ASTM D5185m	>15	0	0	0	
Vanadium	ppm	ASTM D5185m		<1	0	0	
Cadmium	ppm	ASTM D5185m		0	0	0	
ADDITIVES		method	limit/base	current	history1	history2	
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current	history1	history2 5	
	ppm						
Boron		ASTM D5185m	250	6	2	5	
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	6 0	2	5	
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	6 0 61	2 0 61	5 0 56	
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	6 0 61 <1	2 0 61 <1	5 0 56 <1	
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	6 0 61 <1 982	2 0 61 <1 903	5 0 56 <1 894	
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	6 0 61 <1 982 1138	2 0 61 <1 903 1007	5 0 56 <1 894 1039	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	6 0 61 <1 982 1138 1032	2 0 61 <1 903 1007 951	5 0 56 <1 894 1039 966	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150	6 0 61 <1 982 1138 1032 1288	2 0 61 <1 903 1007 951 1207	5 0 56 <1 894 1039 966 1229	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250	6 0 61 <1 982 1138 1032 1288 3904	2 0 61 <1 903 1007 951 1207 3305	5 0 56 <1 894 1039 966 1229 3095	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	6 0 61 <1 982 1138 1032 1288 3904	2 0 61 <1 903 1007 951 1207 3305 history1	5 0 56 <1 894 1039 966 1229 3095 history2	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25	6 0 61 <1 982 1138 1032 1288 3904 current	2 0 61 <1 903 1007 951 1207 3305 history1	5 0 56 <1 894 1039 966 1229 3095 history2	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	6 0 61 <1 982 1138 1032 1288 3904 current 2	2 0 61 <1 903 1007 951 1207 3305 history1 3	5 0 56 <1 894 1039 966 1229 3095 history2	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20	6 0 61 <1 982 1138 1032 1288 3904 current 2 <1	2 0 61 <1 903 1007 951 1207 3305 history1 3	5 0 56 <1 894 1039 966 1229 3095 history2 3 2	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3	6 0 61 <1 982 1138 1032 1288 3904 current 2 <1 2	2 0 61 <1 903 1007 951 1207 3305 history1 3	5 0 56 <1 894 1039 966 1229 3095 history2 3 2 11	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m Method *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3	6 0 61 <1 982 1138 1032 1288 3904 current 2 <1 2 current 0.2	2 0 61 <1 903 1007 951 1207 3305 history1 3 2 4 history1 0.4	5 0 56 <1 894 1039 966 1229 3095 history2 3 2 11 history2	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	6 0 61 <1 982 1138 1032 1288 3904 current 2 <1 2 current 0.2 5.9	2 0 61 <1 903 1007 951 1207 3305 history1 3 2 4 history1 0.4 7.3	5 0 56 <1 894 1039 966 1229 3095 history2 3 2 11 history2 0.4 7.4	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m Method *ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D76145	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3 >20 >30	6 0 61 <1 982 1138 1032 1288 3904 current 2 <1 2 current 0.2 5.9 18.2	2 0 61 <1 903 1007 951 1207 3305 history1 3 2 4 history1 0.4 7.3 18.7	5 0 56 <1 894 1039 966 1229 3095 history2 3 2 11 history2 0.4 7.4 19.6	



Base Number

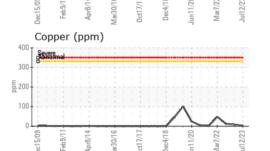
OIL ANALYSIS REPORT

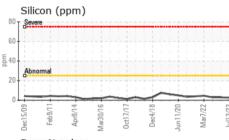


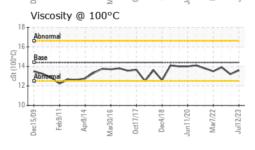
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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
FILIID PROPERT	TIEC	method	limit/hase	current	history1	history2

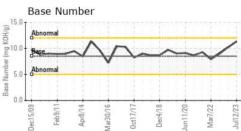
Visc @ 100°C	cSt	ASTM D445	14.4	13.6	13.2	13.9

Iron (ppm)				Lea	ad (ppr	n)	
200 Severe				80 - Sev	ere		
150 100 Abnormal			***************************************	40 Ab	normal		
Dec15/09 Feb9/11	Mar30/16	Dec4/18	Mar7/22	Dec15/09	Feb9/11	Apr8/14 -	Oct17/17
Aluminum (pp	om)			Ch	romiun	n (ppm)	
40 Severe				40 - Sev	ere		
Abnormal	4-4-1-4-4			20 Ab	normal		













Certificate L2367

Laboratory Sample No. Lab Number

Unique Number

: RW0004292 : 05900182 : 10561538 Test Package : MOB 2

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 17 Jul 2023 Diagnosed : 18 Jul 2023 Diagnostician : Wes Davis

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)

CITY OF FARMINGTON HILLS

27245 HALSTED RD FARMINGTON HILLS, MI US 48331

Contact: JERRY BROCK jbrock@fhgov.com

T: (248)871-2850 F:

Contact/Location: JERRY BROCK - CITFARMI