

OIL ANALYSIS REPORT

Sample Rating Trend

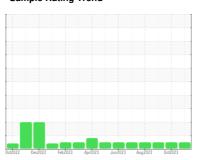
NORMAL



ARIZONA **VOLVO 4874**

Component **Diesel Engine**

NAPA Motor Oil 15W40 (--- QTS)





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

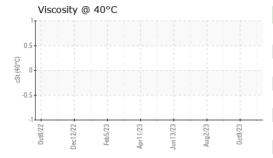
Fluid Condition

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 imit/base current history1 wc0838569 Sample Number Client Info wc0857166 wc0857171 wc0838569 Sample Date Client Info 2331 2155 2003 os 5ep 2023 os 5ep	0 (Q1S)		0ct2022 D	ec2022 Feb2023 Apr	2023 Jun2023 Aug2023	0et2023	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 2331 2165 2003 Oil Age hrs Client Info 1611 1445 1283 Oil Changed Client Info Not Changd Not Changd Not Changd Sample Status Image: Control of Cont	Sample Number		Client Info		WC0857166	WC0857171	WC0838569
Oil Age hrs Client Info 1611 1445 1283 Oil Changed Sample Status Client Info Not Changd Not Changd Not Changd Not Changd NoRMAL Not Changd NoRMAL NoB NoB NoB	Sample Date		Client Info		15 Nov 2023	09 Oct 2023	05 Sep 2023
Oil Changed Sample Status Client Info Not Changd NORMAL NORMAL Not Changd NORMAL Not Changd NORMAL Not Changd NORMAL NORM	Machine Age	hrs	Client Info		2331	2165	2003
Sample Status	Oil Age	hrs	Client Info		1611	1445	1283
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >6.0 <1.0	Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
Water Glycol WC Method Jo.2 NEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 61 57 63 Chromium ppm ASTM D5185m >20 1 1 <1	CONTAMINATIO	N	method	limit/base	current	history1	history2
Second WC Method NEG NEG NEG	Fuel		WC Method	>6.0	<1.0	<1.0	<1.0
Irron	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 1 1 <1 Nickel ppm ASTM D5185m >2 4 3 3 Titanium ppm ASTM D5185m >2 4 3 3 Silver ppm ASTM D5185m >2 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	61	57	63
Titanium	Chromium	ppm	ASTM D5185m	>20	1	1	<1
Silver ppm ASTM D5185m >2 0 <1 0 Aluminum ppm ASTM D5185m >25 4 4 6 Lead ppm ASTM D5185m >40 5 5 5 Copper ppm ASTM D5185m >330 180 179 219 Tin ppm ASTM D5185m >15 4 4 3 Vanadium ppm ASTM D5185m -1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Nickel	ppm	ASTM D5185m	>2	4	3	3
Aluminum ppm ASTM D5185m >25 4 4 6 Lead ppm ASTM D5185m >40 5 5 5 Copper ppm ASTM D5185m >330 180 179 219 Tin ppm ASTM D5185m >15 4 4 3 Vanadium ppm ASTM D5185m <1	Titanium	ppm	ASTM D5185m		<1	<1	0
Lead ppm ASTM D5185m >40 5 5 5 Copper ppm ASTM D5185m >330 180 179 219 Tin ppm ASTM D5185m >15 4 4 3 Vanadium ppm ASTM D5185m <1 <1 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 24 30 35 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 2 2 2 2 Magnesium ppm ASTM D5185m 1668 1651 2115 Phosphor	Silver	ppm	ASTM D5185m	>2	0	<1	0
Copper ppm ASTM D5185m >330 180 179 219 Tin ppm ASTM D5185m >15 4 4 3 Vanadium ppm ASTM D5185m <1	Aluminum	ppm	ASTM D5185m	>25	4	4	6
Tin ppm ASTM D5185m >15 4 4 3 Vanadium ppm ASTM D5185m <1 <1 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 24 30 35 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 56 58 64 Manganese ppm ASTM D5185m 2 2 2 Magnesium ppm ASTM D5185m 480 478 609 Calcium ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m	Lead	ppm	ASTM D5185m	>40	5	5	5
Vanadium ppm ASTM D5185m <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Copper	ppm	ASTM D5185m	>330	180	179	219
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 24 30 35 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 56 58 64 Manganese ppm ASTM D5185m 2 2 2 2 Magnesium ppm ASTM D5185m 480 478 609 609 Calcium ppm ASTM D5185m 1668 1651 2115 1668 1651 2115 1668 1651 2115 1668 1651 2115 1668 1651 2115 1668 3627 215 2338 2468 3627 2338 2468 3627 2338 2468 3627 2338 2468 3627 2338 2468 3627 33 3 3 3 3	Tin	ppm	ASTM D5185m	>15	4	4	3
ADDITIVES	Vanadium	ppm	ASTM D5185m		<1	<1	<1
Boron ppm ASTM D5185m 24 30 35 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 56 58 64 Manganese ppm ASTM D5185m 2 2 2 2 Magnesium ppm ASTM D5185m 480 478 609 Calcium ppm ASTM D5185m 1668 1651 2115 Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m 3 3 3 3 Potassium ppm ASTM D5185m 20 10 11 12 INFRA-RED method limit/	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 56 58 64 Manganese ppm ASTM D5185m 2 2 2 2 Magnesium ppm ASTM D5185m 480 478 609 Calcium ppm ASTM D5185m 1668 1651 2115 Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 56 58 64 Manganese ppm ASTM D5185m 2 2 2 Magnesium ppm ASTM D5185m 480 478 609 Calcium ppm ASTM D5185m 1668 1651 2115 Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation	Boron	ppm	ASTM D5185m		24	30	35
Manganese ppm ASTM D5185m 2 2 2 Magnesium ppm ASTM D5185m 480 478 609 Calcium ppm ASTM D5185m 1668 1651 2115 Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 1111 1143 1360 Sulfur ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7415 >30 23.4 22.0 21.9 <td< td=""><td>Barium</td><td>ppm</td><td>ASTM D5185m</td><td></td><th>0</th><td>0</td><td>0</td></td<>	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 480 478 609 Calcium ppm ASTM D5185m 1668 1651 2115 Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 1111 1143 1360 Sulfur ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 </td <td>Molybdenum</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>56</th> <td>58</td> <td>64</td>	Molybdenum	ppm	ASTM D5185m		56	58	64
Calcium ppm ASTM D5185m 1668 1651 2115 Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 1111 1143 1360 Sulfur ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m 25 13 12 14 Sodium ppm ASTM D5185m 3 3 3 Potassium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2	Manganese	ppm	ASTM D5185m		2	2	2
Phosphorus ppm ASTM D5185m 860 891 1077 Zinc ppm ASTM D5185m 1111 1143 1360 Sulfur ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m 3 3 3 Potassium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1<	Magnesium	ppm	ASTM D5185m		480	478	609
Zinc ppm ASTM D5185m 1111 1143 1360 Sulfur ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Calcium	ppm	ASTM D5185m		1668	1651	2115
Sulfur ppm ASTM D5185m 2338 2468 3627 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Phosphorus	ppm	ASTM D5185m		860	891	1077
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m 3 3 3 Potassium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Zinc	ppm	ASTM D5185m		1111	1143	1360
Silicon ppm ASTM D5185m >25 13 12 14 Sodium ppm ASTM D5185m 3 3 3 Potassium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Sulfur	ppm	ASTM D5185m		2338	2468	3627
Sodium ppm ASTM D5185m 3 3 3 Potassium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	CONTAMINANT	S	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 10 11 12 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Silicon	ppm	ASTM D5185m	>25	13	12	14
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Sodium	ppm	ASTM D5185m		3	3	3
Soot % % *ASTM D7844 >3 0.8 0.6 0.6 Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Potassium	ppm	ASTM D5185m	>20	10	11	12
Nitration Abs/cm *ASTM D7624 >20 10.4 9.8 9.5 Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 23.4 22.0 21.9 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Soot %	%	*ASTM D7844	>3	8.0	0.6	0.6
FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2520.318.918.5	Nitration	Abs/cm	*ASTM D7624	>20	10.4	9.8	9.5
Oxidation Abs/.1mm *ASTM D7414 >25 20.3 18.9 18.5	Sulfation	Abs/.1mm	*ASTM D7415	>30	23.4	22.0	21.9
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 6.4 5.6 6.2	Oxidation	Abs/.1mm	*ASTM D7414	>25	20.3	18.9	18.5
	Base Number (BN)	mg KOH/g	ASTM D2896		6.4	5.6	6.2



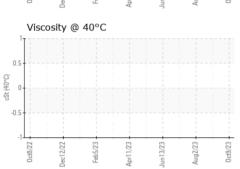
OIL ANALYSIS REPORT

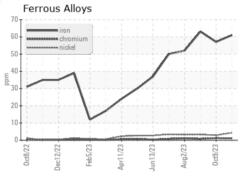


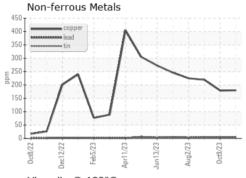
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	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

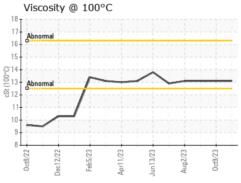
Abnormal 6		+		
4 Abnormal	_		<u> </u>	
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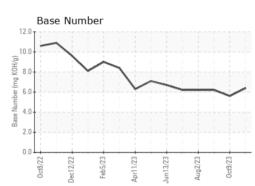
















Laboratory Sample No. Lab Number Unique Number : 10752112

: WC0857166 : 06012968

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

: 20 Nov 2023 : 22 Nov 2023 Diagnostician : Jonathan Hester

Test Package : FLEET (Additional Tests: KV40) 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)

LIBERTY DISPOSAL 6401 S EASTERN AVE

OKLAHOMA CITY, OK US 73149

Contact: CATHY ROSA c.rosa@ldi89.com

T:

F: Contact/Location: CATHY ROSA - SEAOKL