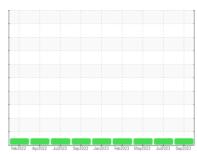


OIL ANALYSIS REPORT

Sample Rating Trend







Machine Id 1713 Component Diesel Engine

DIESEL ENGINE OIL SAE 15W40 (--- GAL)

וט	А	G۱۱	M		5	15
				~		

Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample. Please specify the brand, type, and viscosity of the oil on your next sample.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the

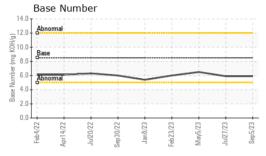
Fluid Condition

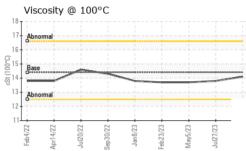
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORMATION method limit/base current history1 history2			Feb 2022 Ap	2022 Jul2022 Sep2022	Jan2023 Feb2023 May2023 Jul20	23 Sep2023	
Sample Date	SAMPLE INFORM	NOITAN	method	limit/base	current	history1	history2
Machine Age mls Client Info 208957 203357 197749 Oil Age mls Client Info 0 0 0 Oil Changed Client Info Changed N/A Changed Sample Status Image: Control of Changed N/A NoRMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method S5 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG WEAR METALS method limil/base current history1 history2 Iron ppm ASTM D5185m >100 7 8 9 Chromium ppm ASTM D5185m >20 0 <1 <1 0 <1 <1 0 <1 <1 0 <1 <1 0 <1 <1 0 <1 <1 <1 <1 <1 <1 <1 <1 <1	Sample Number		Client Info		WC0844992	WC0827068	WC0790619
Oil Age mls Client Info Changed NORMAL N/A Changed NORMAL Sample Status Client Info Changed NORMAL N/A Changed NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0	Sample Date		Client Info		05 Sep 2023	27 Jul 2023	05 May 2023
Oil Changed Sample Status Client Info Changed NORMAL N/A Changed NORMAL N/A Changed NORMAL	Machine Age	mls	Client Info		208957	203357	197749
Sample Status	Oil Age	mls			0	0	0
CONTAMINATION 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 7 8 9 Chromium ppm ASTM D5185m >20 0 <1 <1 Nickel ppm ASTM D5185m >4 0 0 0 Silver ppm ASTM D5185m >4 0 0 0 Silver ppm ASTM D5185m >40 <1 0 <1 Silver ppm ASTM D5185m >30 3 2 15 Copper ppm ASTM D5185m >40 <1 0 <1 Copper ppm ASTM D5185m >10 0 0 <1 Vanad			Client Info				Ü
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
MEG NEG NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 limit/base current history1 history2 limit/base current history1 history2 limit/base current history1 limit/base current limit/base current history1 limit/base current limit/base current history1 limit/base current history1 limit/base current limit/base limit/base	CONTAMINATIO	N	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium ppm ASTM D5185m >20 0 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	7	8	9
Titanium ppm ASTM D5185m <1	Chromium	ppm	ASTM D5185m	>20	0	<1	<1
Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >20 <1	Nickel	ppm	ASTM D5185m	>4	0	0	0
Aluminum	Titanium	ppm	ASTM D5185m		<1	0	<1
Lead	Silver	ppm	ASTM D5185m	>3	0		
Copper ppm ASTM D5185m >330 3 2 15 Tin ppm ASTM D5185m >15 0 0 <1 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 19 16 10 Barium ppm ASTM D5185m 100 0 2 0 Molybdenum ppm ASTM D5185m 100 77 82 71 Manganese ppm ASTM D5185m 100 <1 <1 <1 Magnesium ppm ASTM D5185m 450 261 291 347 Calcium ppm ASTM D5185m 450 261 291 1877 Phosphorus ppm ASTM D5185m 1350 1352 <th>Aluminum</th> <th>ppm</th> <th>ASTM D5185m</th> <th>>20</th> <th><1</th> <th>2</th> <th>2</th>	Aluminum	ppm	ASTM D5185m	>20	<1	2	2
Tin ppm ASTM D5185m >15 0 0 <1	Lead	ppm			<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 19 16 10 Barium ppm ASTM D5185m 10 0 2 0 Molybdenum ppm ASTM D5185m 100 77 82 71 Manganese ppm ASTM D5185m 100 77 82 71 Magnesium ppm ASTM D5185m 450 261 291 347 Calcium ppm ASTM D5185m 450 261 291 347 Phosphorus ppm ASTM D5185m 1150 1059 1078 1003 Zinc ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m >25 7 7	Copper	ppm	ASTM D5185m	>330	3	2	15
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 19 16 10 Barium ppm ASTM D5185m 10 0 2 0 Molybdenum ppm ASTM D5185m 100 77 82 71 Manganese ppm ASTM D5185m 100 77 82 71 Magnesium ppm ASTM D5185m 450 261 291 347 Calcium ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base curr	****			>15	-		
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 250 19 16 10 Barium ppm ASTM D5185m 10 0 2 0 Molybdenum ppm ASTM D5185m 100 77 82 71 Manganese ppm ASTM D5185m 0 41 <1 Magnesium ppm ASTM D5185m 450 261 291 347 Calcium ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m		ppm			-		
Boron	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 10 0 2 0 Molybdenum ppm ASTM D5185m 100 77 82 71 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 450 261 291 347 Calcium ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 1150 1059 1078 1003 Zinc ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >2	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 100 77 82 71 Manganese ppm ASTM D5185m 0 <1	Boron	ppm	ASTM D5185m	250	19	16	10
Manganese ppm ASTM D5185m 0 <1	Barium	ppm	ASTM D5185m	10	0	2	0
Magnesium ppm ASTM D5185m 450 261 291 347 Calcium ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 1150 1059 1078 1003 Zinc ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.3 Nitration Abs/:nm *ASTM	Molybdenum	ppm		100		82	71
Calcium ppm ASTM D5185m 3000 2019 2071 1877 Phosphorus ppm ASTM D5185m 1150 1059 1078 1003 Zinc ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method	•	ppm	ASTM D5185m		0	<1	<1
Phosphorus ppm ASTM D5185m 1150 1059 1078 1003 Zinc ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 10.3 10.5 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm	Magnesium	nnm					
Zinc ppm ASTM D5185m 1350 1352 1338 1250 Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 10.3 10.5 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm<	Calaium	ppiii					
Sulfur ppm ASTM D5185m 4250 3634 4196 3408 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1 2 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 10.3 10.5 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.8 19.1 21.1			ASTM D5185m	3000	2019	2071	1877
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1	Phosphorus	ppm ppm	ASTM D5185m ASTM D5185m	3000 1150	2019 1059	2071 1078	1877 1003
Silicon ppm ASTM D5185m >25 7 7 4 Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1	Phosphorus Zinc	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	3000 1150 1350	2019 1059 1352	2071 1078 1338	1877 1003 1250
Sodium ppm ASTM D5185m >158 7 9 3 Potassium ppm ASTM D5185m >20 1 <1	Phosphorus Zinc Sulfur	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	3000 1150 1350 4250	2019 1059 1352	2071 1078 1338 4196	1877 1003 1250 3408
Potassium ppm ASTM D5185m >20 1 <1	Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	3000 1150 1350 4250 limit/base	2019 1059 1352 3634 current	2071 1078 1338 4196 history1	1877 1003 1250 3408 history2
INFRA-RED	Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	3000 1150 1350 4250 limit/base >25	2019 1059 1352 3634 current	2071 1078 1338 4196 history1	1877 1003 1250 3408 history2
Soot % % *ASTM D7844 >3 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 10.3 10.5 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.8 19.1 21.1	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m	3000 1150 1350 4250 limit/base >25 >158	2019 1059 1352 3634 current 7	2071 1078 1338 4196 history1 7	1877 1003 1250 3408 history2 4
Nitration Abs/cm *ASTM D7624 >20 10.3 10.5 10.6 Sulfation Abs/.1mm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.8 19.1 21.1	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m	3000 1150 1350 4250 limit/base >25 >158 >20	2019 1059 1352 3634 current 7 7	2071 1078 1338 4196 history1 7 9 <1	1877 1003 1250 3408 history2 4 3
Sulfation Abs/.1mm *ASTM D7415 >30 22.0 22.0 23.0 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.8 19.1 21.1	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	2019 1059 1352 3634 current 7 7	2071 1078 1338 4196 history1 7 9 <1	1877 1003 1250 3408 history2 4 3 2
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 18.8 19.1 21.1	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method *ASTM D7844	3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3	2019 1059 1352 3634	2071 1078 1338 4196 history1 7 9 <1 history1 0.3	1877 1003 1250 3408 history2 4 3 2 history2
Oxidation Abs/.1mm *ASTM D7414 >25 18.8 19.1 21.1	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624	3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3 >20	2019 1059 1352 3634 current 7 7 1 current 0.3 10.3	2071 1078 1338 4196 history1 7 9 <1 history1 0.3 10.5	1877 1003 1250 3408 history2 4 3 2 history2 0.3 10.6
	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm Abs/cm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624	3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3 >20	2019 1059 1352 3634 current 7 7 1 current 0.3 10.3	2071 1078 1338 4196 history1 7 9 <1 history1 0.3 10.5	1877 1003 1250 3408 history2 4 3 2 history2 0.3 10.6
Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 5.9 6.5	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm Abs/cm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m *ASTM D7844 *ASTM D7624 *ASTM D7415	3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3 >20 >3	2019 1059 1352 3634 current 7 7 1 current 0.3 10.3 22.0	2071 1078 1338 4196 history1 7 9 <1 history1 0.3 10.5 22.0	1877 1003 1250 3408 history2 4 3 2 history2 0.3 10.6 23.0
	Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm ppm Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3 >20 >3 limit/base	2019 1059 1352 3634 current 7 7 1 current 0.3 10.3 22.0 current	2071 1078 1338 4196 history1 7 9 <1 history1 0.3 10.5 22.0 history1	1877 1003 1250 3408 history2 4 3 2 history2 0.3 10.6 23.0 history2



OIL ANALYSIS REPORT

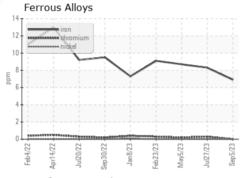


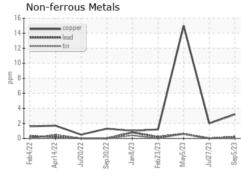


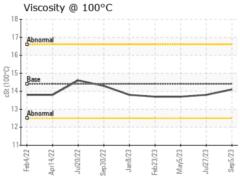
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

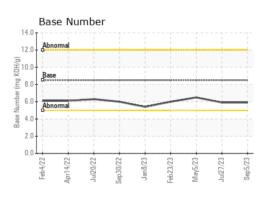
FLUID PROPE	RTIES	method				history2
Visc @ 100°C	cSt	ASTM D445	14.4	14.1	13.8	13.7

GRAPHS













Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** Test Package : FLEET

: WC0844992 : 05963260 : 10669811

To discuss this sample report, contact Customer Service at 1-800-237-1369.

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

: 28 Sep 2023 : 29 Sep 2023 Diagnosed Diagnostician : Wes Davis

TOWN OF CHAPEL HILL

6900 MILLHOUSE RD CHAPEL HILL, NC US 27516

Contact: Lisa DePasqua

Idepasqua@townofchapelhill.org T: (919)696-4941

* - 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)

Contact/Location: Lisa DePasqua - TOWCHANC