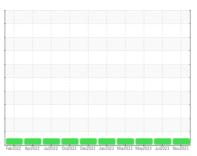


# **OIL ANALYSIS REPORT**

## Sample Rating Trend



NORMAL



Machine Id 1954 Component

**Diesel Engine** 

**DIESEL ENGINE OIL SAE 5W30 (--- GAL)** 

#### 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

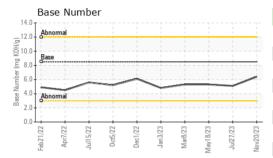
## **Fluid Condition**

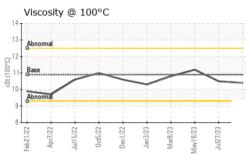
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORMATION   method   limit/base   current   history1   history2			Feb2022 Apr2	022 Jul2022 Oct2022 Dec2	022 Jan2023 Mar2023 May2023 Jul2	023 Nov2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Date         Client Info         20 Nov 2023         27 Jul 2023         18 May 2023           Machine Age         mis         Client Info         106491         98233         94113           Oil Age         mis         Client Info         6000         6000         6000         6000           Oil Changed         Client Info         Changed         C	Sample Number		Client Info		WC0860357	WC0827070	WC0810359
Machine Age         mls         Client Info         6000         6000         6000           Oil Age         mls         Client Info         6000         6000         6000           Oil Changed         Client Info         Changed C			Client Info		20 Nov 2023	27 Jul 2023	18 May 2023
Oil Age         mls         Client Info         6000         6000         6000           Oil Changed Sample Status         Client Info         Changed Changed Changed Changed Changed NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL         Changed Changed Changed Changed Changed NORMAL		mls	Client Info		106491	98233	
Sample Status	-	mls	Client Info		6000	6000	6000
Sample Status	Oil Changed		Client Info		Changed	Changed	Changed
Fuel					_		NORMAL
Water Glycol         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         3         6         5           Chromium         ppm         ASTM D5185m         >20         <1	CONTAMINATIO	N	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         3         6         5           Chromium         ppm         ASTM D5185m         >20         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100		6	5
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185m	>4	<1	0	<1
Aluminum	Titanium	ppm	ASTM D5185m		<1	0	<1
Lead         ppm         ASTM D5185m         >40         0         0         0           Copper         ppm         ASTM D5185m         >330         <1         <1         <1           Tin         ppm         ASTM D5185m         >15         <1         0         0           Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         78         39         40           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         78         39         40           ADDITIVES         method         limit/base         current         history1         history2           Barium         ppm         ASTM D5185m         10         <1         2         0           Barium         ppm         ASTM D5185m         450         554         606         459 <t< td=""><td>Silver</td><td>ppm</td><td>ASTM D5185m</td><td>&gt;3</td><th>0</th><td>0</td><td>0</td></t<>	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper         ppm         ASTM D5185m         >330         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <0         0           <1         0         0         0           <1         0         0         0           <1         0         0         0           <1         0         0         0            <1         0         0         0            <1         0         0         0            <1         0         <1         2           <1         <1         0          <1         <1         <1         0           <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	Aluminum	ppm	ASTM D5185m	>20	2	2	<1
Tin         ppm         ASTM D5185m         >15         <1         0         0           Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         78         39         40           Barium         ppm         ASTM D5185m         10         <1         2         0           Molybdenum         ppm         ASTM D5185m         100         191         78         82           Manganese         ppm         ASTM D5185m         100         191         78         82           Magnesium         ppm         ASTM D5185m         450         554         606         459           Calcium         ppm         ASTM D5185m         3000         1113         1447         1480           Phosphorus         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         225         7         16	Lead	ppm	ASTM D5185m	>40	0	0	0
Vanadium         ppm         ASTM D5185m         <1         0         0           Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         78         39         40           Barium         ppm         ASTM D5185m         10         <1         2         0           Molybdenum         ppm         ASTM D5185m         100         191         78         82           Mangaese         ppm         ASTM D5185m         100         191         78         82           Magnesium         ppm         ASTM D5185m         450         554         606         459           Calcium         ppm         ASTM D5185m         3000         1113         1447         1480           Phosphorus         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1 <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;330</td> <th>&lt;1</th> <td>&lt;1</td> <td>&lt;1</td>	Copper	ppm	ASTM D5185m	>330	<1	<1	<1
Cadmium         ppm         ASTM D5185m         <1         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         78         39         40           Barium         ppm         ASTM D5185m         10         <1	Tin	ppm	ASTM D5185m	>15	<1	0	0
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         78         39         40           Barium         ppm         ASTM D5185m         10         <1	Vanadium	ppm	ASTM D5185m		<1	0	0
Boron	Cadmium	ppm	ASTM D5185m		<1	0	0
Barium         ppm         ASTM D5185m         10         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         100         191         78         82           Manganese         ppm         ASTM D5185m         < 1         <1         0           Magnesium         ppm         ASTM D5185m         450         554         606         459           Calcium         ppm         ASTM D5185m         3000         1113         1447         1480           Phosphorus         ppm         ASTM D5185m         1150         561         788         777           Zinc         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1         2         <1           Potassium         ppm         ASTM D5185m         >20         <1         <1         2           INFRA-RED         method         limit/base         current<	Boron	ppm	ASTM D5185m	250	78	39	40
Manganese         ppm         ASTM D5185m         <1         <1         0           Magnesium         ppm         ASTM D5185m         450         554         606         459           Calcium         ppm         ASTM D5185m         3000         1113         1447         1480           Phosphorus         ppm         ASTM D5185m         1150         561         788         777           Zinc         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1         2         <1           Potassium         ppm         ASTM D5185m         >20         <1         <1         2         <1           Soot %         %         *ASTM D7844         >3         0         0         0         0           Nitration         Abs/m <t< td=""><td>Barium</td><td>ppm</td><td>ASTM D5185m</td><td>10</td><th>&lt;1</th><td>2</td><td>0</td></t<>	Barium	ppm	ASTM D5185m	10	<1	2	0
Magnesium         ppm         ASTM D5185m         450         554         606         459           Calcium         ppm         ASTM D5185m         3000         1113         1447         1480           Phosphorus         ppm         ASTM D5185m         1150         561         788         777           Zinc         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1	Molybdenum	ppm	ASTM D5185m	100	191	78	82
Calcium         ppm         ASTM D5185m         3000         1113         1447         1480           Phosphorus         ppm         ASTM D5185m         1150         561         788         777           Zinc         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1	Manganese	ppm	ASTM D5185m		<1	<1	0
Phosphorus         ppm         ASTM D5185m         1150         561         788         777           Zinc         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1	Magnesium	ppm	ASTM D5185m	450	554	606	459
Zinc         ppm         ASTM D5185m         1350         679         970         965           Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1	Calcium	ppm	ASTM D5185m	3000	1113	1447	1480
Sulfur         ppm         ASTM D5185m         4250         2588         3812         3511           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         >20         <1	Phosphorus	ppm	ASTM D5185m	1150	561	788	777
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         <1	Zinc	ppm	ASTM D5185m	1350	679	970	965
Silicon         ppm         ASTM D5185m         >25         7         16         7           Sodium         ppm         ASTM D5185m         <1	Sulfur	ppm	ASTM D5185m	4250	2588	3812	3511
Sodium         ppm         ASTM D5185m         <1	CONTAMINANTS	;	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         <1	Silicon	ppm	ASTM D5185m	>25	7		7
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0         0         0           Nitration         Abs/cm         *ASTM D7624         >20         7.5         11.3         10.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.7         22.6         22.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         10.3         17.3         17.6	Sodium	ppm	ASTM D5185m		<1	2	<1
Soot %         %         *ASTM D7844 >3         0         0         0           Nitration         Abs/cm         *ASTM D7624 >20         7.5         11.3         10.6           Sulfation         Abs/.1mm         *ASTM D7415 >30         16.7         22.6         22.4           FLUID DEGRADATION method limit/base current history1 history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         10.3         17.3         17.6	Potassium	ppm	ASTM D5185m	>20	<1	<1	2
Nitration         Abs/cm         *ASTM D7624         >20         7.5         11.3         10.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         16.7         22.6         22.4           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         10.3         17.3         17.6	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         16.7         22.6         22.4           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         10.3         17.3         17.6	Soot %	%	*ASTM D7844	>3	0	0	0
FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 10.3 17.3 17.6	Nitration	Abs/cm	*ASTM D7624	>20	7.5	11.3	10.6
Oxidation Abs/.1mm *ASTM D7414 >25 <b>10.3</b> 17.3 17.6	Sulfation	Abs/.1mm	*ASTM D7415	>30	16.7	22.6	22.4
	FLUID DEGRADATION method limit/base current history1 history2						
Base Number (BN)         mg KOH/g         ASTM D2896         8.5         6.4         5.1         5.3	Oxidation	Abs/.1mm	*ASTM D7414	>25	10.3	17.3	17.6
	Base Number (BN)	mg KOH/g	ASTM D2896	8.5	6.4	5.1	5.3



# **OIL ANALYSIS REPORT**

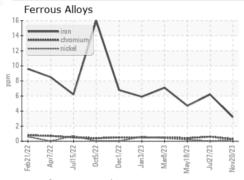


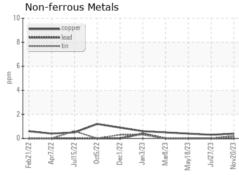


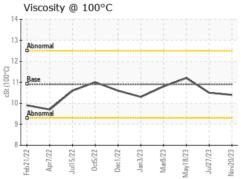
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

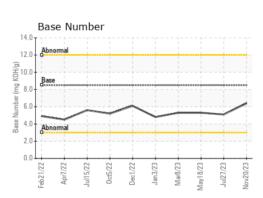
FLUID PROPERTIES		method				history2
Visc @ 100°C	cSt	ASTM D445	10.9	10.4	10.5	11.2

## **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number Unique Number : 10752939 Test Package : FLEET

: WC0860357 : 06013795

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

: 21 Nov 2023 Diagnostician : Don Baldridge

: 23 Nov 2023

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

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

**TOWN OF CHAPEL HILL** 

6900 MILLHOUSE RD

CHAPEL HILL, NC

US 27516

\* - 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