

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



HC2211

Component **Diesel Engine**

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

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

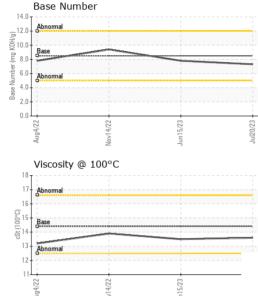
Fluid Condition

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

Aug ² 022 16v/2022 Jun ² 023 Jul ² 023						
SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0704441	WC0810564	WC0687038
Sample Date		Client Info		20 Jul 2023	15 Jun 2023	14 Nov 2022
Machine Age	hrs	Client Info		6870	6600	5994
Oil Age	hrs	Client Info		0	0	388
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	V	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	2	3	5
Chromium	ppm	ASTM D5185m	>20	<1	0	<1
Nickel	ppm	ASTM D5185m	>4	<1	0	0
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>3	0	0	<1
Aluminum	ppm	ASTM D5185m	>20	2	7	1
Lead	ppm	ASTM D5185m	>40	<1	1	<1
Copper	ppm	ASTM D5185m	>330	2	6	18
Tin	ppm	ASTM D5185m	>15	<1	0	0
Vanadium	ppm	ASTM D5185m		0	0	0
Cadmium	ppm	ASTM D5185m		^	0	0
• • • • • • • • • • • • • • • • • • • •	ppiii	ASTIVI DSTOSIII		0	0	U
ADDITIVES	ррш	method	limit/base	current	history1	history2
	ррт		limit/base			
ADDITIVES		method		current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	250	current	history1	history2
ADDITIVES Boron Barium	ppm	method ASTM D5185m ASTM D5185m	250 10	current 130 0	history1 10 0	history2 2 1
ADDITIVES Boron Barium Molybdenum	ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	250 10	current 130 0 11	history1 10 0 58	history2 2 1 61
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	current 130 0 11 <1	history1 10 0 58	history2 2 1 61 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	current 130 0 11 <1 195	history1 10 0 58 0 919	history2 2 1 61 <1 759
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	current 130 0 11 <1 195 2071	history1 10 0 58 0 919 1227	history2 2 1 61 <1 759 1344
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150	current 130 0 11 <1 195 2071 1043	history1 10 0 58 0 919 1227 1006	history2 2 1 61 <1 759 1344 980
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350	current 130 0 11 <1 195 2071 1043 1284	history1 10 0 58 0 919 1227 1006 1278	history2 2 1 61 <1 759 1344 980 1205
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250	current 130 0 11 <1 195 2071 1043 1284 4413	history1 10 0 58 0 919 1227 1006 1278 3714	history2 2 1 61 <1 759 1344 980 1205 3558
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base	current 130 0 11 <1 195 2071 1043 1284 4413 current	history1 10 0 58 0 919 1227 1006 1278 3714 history1	history2 2 1 61 <1 759 1344 980 1205 3558 history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25	current 130 0 11 <1 195 2071 1043 1284 4413 current 7	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	current 130 0 11 <1 195 2071 1043 1284 4413 current 7	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6 2	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20	current 130 0 11 <1 195 2071 1043 1284 4413 current 7 4 7	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6 2 0	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7 1
ADDITIVES 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	method ASTM D5185m method	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3	current 130 0 11 <1 195 2071 1043 1284 4413 current 7 4 7	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6 2 0 history1	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7 1 0 history2
ADDITIVES 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	method ASTM D5185m method 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	current 130 0 11 <1 195 2071 1043 1284 4413 current 7 4 7 current 0.1	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6 2 0 history1 0.1	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7 1 0 history2 0.1
ADDITIVES 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	method 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	current 130 0 11 <1 195 2071 1043 1284 4413 current 7 4 7 current 0.1 7.5	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6 2 0 history1 0.1 9.3	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7 1 0 history2 0.1 9.4
ADDITIVES 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	method ASTM D5185m method *ASTM D5185m *ASTM D5185m ASTM D5185m *ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m 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	current 130 0 11 <1 195 2071 1043 1284 4413 current 7 4 7 current 0.1 7.5 21.3	history1 10 0 58 0 919 1227 1006 1278 3714 history1 6 2 0 history1 0.1 9.3 20.0	history2 2 1 61 <1 759 1344 980 1205 3558 history2 7 1 0 history2 0.1 9.4 21.0



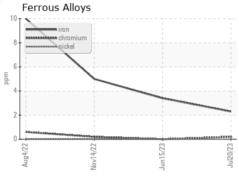
OIL ANALYSIS REPORT

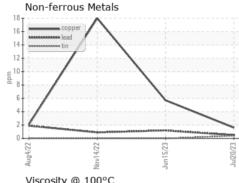


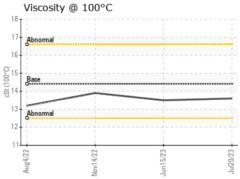
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

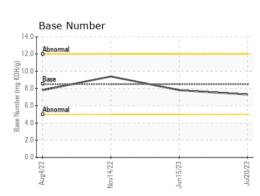
FLUID PHOPENTIES		memod			riistory i	History∠	
	Visc @ 100°C	cSt	ASTM D445	14.4	13.6	13.5	13.9

GRAPHS













Laboratory Sample No. Lab Number Unique Number : 10605329

: WC0704441 : 05925382

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

: 15 Aug 2023 : 16 Aug 2023 Diagnostician : Wes Davis

US 77378 Contact: JOHN HAWKINS johnh@bucknercompanies.com

BUCKNER - WILLIS

18123 HWY 75 NORTH

Test Package : CONST (Additional Tests: TBN) 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) WILLIS, TX

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