

OIL ANALYSIS REPORT



Machine Id **4550** Component **Diesel Engine** Fluid **CITGO CITGUARD 600 15W40 (--- 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 INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0891582	WC0891579	
Sample Date		Client Info		22 Mar 2024	04 Jan 2024	
Machine Age	mls	Client Info		0	702829	
Oil Age	mls	Client Info		18000	15000	
Oil Changed		Client Info		Changed	Changed	
Sample Status				NORMAL	NORMAL	
CONTAMINATION	٧	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	
Water		WC Method	>0.2	NEG	NEG	
Glycol		WC Method		NEG	NEG	
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	48	45	
Chromium	ppm	ASTM D5185m	>20	<1	<1	
Nickel	ppm	ASTM D5185m	>4	0	0	
Titanium	ppm	ASTM D5185m		0	0	
Silver	ppm	ASTM D5185m	>3	0	<1	
Aluminum	ppm	ASTM D5185m	>20	2	3	
Lead	ppm	ASTM D5185m	>40	23	20	
Copper	ppm	ASTM D5185m	>330	2	2	
Tin	ppm	ASTM D5185m	>15	0	<1	
Vanadium	ppm	ASTM D5185m		0	0	
Cadmium	ppm	ASTM D5185m		0	0	
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 13	current 34	history1 50	history2
	ppm ppm					
Boron		ASTM D5185m	13	34	50	
Boron Barium	ppm	ASTM D5185m ASTM D5185m	13 0	34 0	50 0	
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	13 0	34 0 84	50 0 82	
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	13 0 57	34 0 84 <1	50 0 82 <1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	13 0 57 825	34 0 84 <1 529	50 0 82 <1 473 2119 1323	
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	13 0 57 825 1100	34 0 84 <1 529 2428	50 0 82 <1 473 2119	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	13 0 57 825 1100 933	34 0 84 <1 529 2428 1345	50 0 82 <1 473 2119 1323	
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	13 0 57 825 1100 933 1089	34 0 84 <1 529 2428 1345 1602	50 0 82 <1 473 2119 1323 1643	
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	13 0 57 825 1100 933 1089 2769 limit/base	34 0 84 <1 529 2428 1345 1602 4328	50 0 82 <1 473 2119 1323 1643 3782	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	13 0 57 825 1100 933 1089 2769 limit/base	34 0 84 <1 529 2428 1345 1602 4328 current	50 0 82 <1 473 2119 1323 1643 3782 history1	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	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	13 0 57 825 1100 933 1089 2769 2769 2769	34 0 84 <1 529 2428 1345 1602 4328 current 7	50 0 82 <1 473 2119 1323 1643 3782 history1 9	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm 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 ASTM D5185m	13 0 57 825 1100 933 1089 2769 2769 2769	34 0 84 <1 529 2428 1345 1602 4328 current 7 4	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	13 0 57 825 1100 933 1089 2769 2769 2769 225	34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 2 3	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	13 0 57 825 1100 933 1089 2769 2769 2769 225 >20	34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 9	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 3 history1	 history2 history2
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 ppm	ASTM D5185m ASTM D5185m	13 0 57 825 1100 933 1089 2769 2769 2769 225 >20 20 1imit/base >20	34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 <u>current</u> 1.3	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 3 history1 1.4	 history2 history2 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 ASTM D5185m	13 0 57 825 1100 933 1089 2769 2769 2769 2769 225 20 imit/base >20	34 0 84 <1 529 2428 1345 1602 4328 current 7 4 9 current 1.3 12.3	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 history1 1.4 1.4 11.7	 history2 history2
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 ASTM D7844 *ASTM D7624 *ASTM D7415	13 0 57 825 1100 933 1089 2769 2769 2769 225 20 220 320 33 220 330	34 0 84 <1 529 2428 1345 1602 4328 <u>current</u> 7 4 9 <u>current</u> 1.3 12.3 29.7	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 3 history1 1.4 1.7 28.6	 history2 history2 history2
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 ASTM D7844 *ASTM D7844 *ASTM D7844	13 0 57 825 1100 933 1089 2769 2769 2769 225 20 220 220 20 33 20 20 30 20 30	34 0 84 <1 529 2428 1345 1602 4328 <i>current</i> 7 4 9 <i>current</i> 1.3 12.3 29.7	50 0 82 <1 473 2119 1323 1643 3782 history1 9 2 3 history1 1.4 11.7 28.6 history1	 history2 history2 history2 history2



OIL ANALYSIS REPORT

40 35 30 5 25 20 4 0 20 4 0 20 4 0 20 4 0 20 20 20 20 20 20 20 20 20 20 20 20 2		White Metal	scalar	*\/iouol	NONE	NONE		
30 Sulfation Sulfation				visuai	INDINE	NONE	NONE	
Abnormal	Non-the-statement of the	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	
		Precipitate	scalar	*Visual	NONE	NONE	NONE	
/11+		Silt	scalar	*Visual	NONE	NONE	NONE	
15-		Debris	scalar	*Visual	NONE	NONE	NONE	
		Sand/Dirt		*Visual	NONE	NONE	NONE	
Jan 4/24 -	2/24 -	Appearance	scalar	*Visual	NORML	NORML	NORML	
Jan	Mar22/24	Odor	scalar	*Visual	NORML	NORML	NORML	
Da ao Numbran		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	
Base Number		Free Water	scalar	*Visual		NEG	NEG	
(10.0		FLUID PROPER	TIES	method	limit/base	current	history1	history2
× 8.0 E 6.0		Visc @ 100°C	cSt	ASTM D445	15.4	14.2	14.2	
a 6.0 qm V 4.0		GRAPHS						
2.0 -		Ferrous Alloys						
0.0		50 iron						
Jan 4,24	1000	40 - nickel						
	- P.I							
Viscosity @ 100°C		30						
19		20						
18 + Abnormal 17 -								
© 16 Base 0 15		10-						
0 15								
13 - Abnormal		Jan 4/24			Mar22/2 ⁴			
12					W			
	ve	Non-ferrous Meta	IS					
Jan4/24	сс~и	copper						
	*1	20 - tin						
		15-						
		Edd						
		10						
		5-						
		an4/24			2/24 -			
		Jan			Mar2			
		Viscosity @ 100°	C			Base Number		
		19			12.0			
		18 - Abnormal			10.0	<u> </u>		
		17			(B/HO) 8.0			
		3 16 - Base 0 15			(B)		_	
		73 14 -			a 6.0			
		13			≥ 4.0 ase g			
		Abnormal			2.0			
		11						
		Jan4/24			Mar22/24	Jan4/24		Mar22/24
					Mai	٦ و		Mai
Certificate 12367	Sample No. : Lab Number : Unique Number : Test Package : s sample report, c	10954968	Recei Teste Diagr	ved : 01 d : 02 nosed : 04	Apr 2024 2 Apr 2024 Apr 2024 - Se 9.	an Felton	JOHN Contact: BR prandon.irish@or	00 RAVINE DR SON CITY, TN US 37601 ANDON IRISH

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