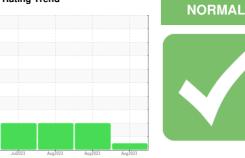


OIL ANALYSIS REPORT

Sample Rating Trend





Component **Front Diesel Engine**

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

DIAGNOSIS Recommendation

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

Wear

Metal levels are typical for a new component breaking in.

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 INFOR		mothed	limit/base	ourroat	bietorut	bistory
	VIATION		iimit/base		history1	history2
Sample Number		Client Info		GFL0087857	GFL0091214	GFL0087835
Sample Date		Client Info		22 Aug 2023	11 Aug 2023	04 Aug 2023
Machine Age	hrs	Client Info		451	3123	366
Oil Age	hrs	Client Info		50	600	366
Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Sample Status				NORMAL	ABNORMAL	ABNORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
Glycol		WC Method		NEG	NEG	NEG
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>120	4	29	27
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>5	0	<1	0
Titanium	ppm	ASTM D5185m	>2	0	<1	<1
Silver	ppm	ASTM D5185m	>2	<1	<1	1
Aluminum	ppm	ASTM D5185m	>20	4	9	8
Lead	ppm	ASTM D5185m	>40	0	2	0
Copper	ppm	ASTM D5185m	>330	13	89	54
Tin	ppm	ASTM D5185m	>15	<1	2	2
Vanadium	ppm	ASTM D5185m		0	<1	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	Method ASTM D5185m	limit/base 250	current 21	history1 268	history2 256
	ppm ppm					
Boron		ASTM D5185m	250	21	268	256
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	21 0	268 0	256 <1
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	21 0 68	268 0 109	256 <1 106
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	21 0 68 <1	268 0 109 3	256 <1 106 3
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	21 0 68 <1 1020	268 0 109 3 687	256 <1 106 3 690
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	21 0 68 <1 1020 1148	268 0 109 3 687 1535	256 <1 106 3 690 1437
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	250 10 100 450 3000 1150	21 0 68 <1 1020 1148 1124	268 0 109 3 687 1535 727	256 <1 106 3 690 1437 728
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	250 10 100 450 3000 1150 1350	21 0 68 <1 1020 1148 1124 1340	268 0 109 3 687 1535 727 877	256 <1 106 3 690 1437 728 876
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	250 10 100 450 3000 1150 1350 4250 limit/base	21 0 68 <1 1020 1148 1124 1340 4031	268 0 109 3 687 1535 727 877 2885	256 <1 106 3 690 1437 728 876 2895
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	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	250 10 100 450 3000 1150 1350 4250 limit/base >25	21 0 68 <1 1020 1148 1124 1340 4031 current	268 0 109 3 687 1535 727 877 2885 history1	256 <1 106 3 690 1437 728 876 2895 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158	21 0 68 <1 1020 1148 1124 1340 4031 current 11	268 0 109 3 687 1535 727 877 2885 history1 ▲ 84	256 <1 106 3 690 1437 728 876 2895 876 2895 history2 ▲ 86
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m 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	21 0 68 <1 1020 1148 1124 1340 4031 current 11 2	268 0 109 3 687 1535 727 877 2885 history1 ▲ 84 5	256 <1 106 3 690 1437 728 876 2895 kistory2 ▲ 86 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	21 0 68 <1 1020 1148 1124 1340 4031 current 11 2 2	268 0 109 3 687 1535 727 877 2885 history1 ▲ 84 5 24	256 <1 106 3 690 1437 728 876 2895 bistory2 ▲ 86 3 20
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	21 0 68 <1 1020 1148 1124 1340 4031 <u>current</u> 11 2 2 2	268 0 109 3 687 1535 727 877 2885 history1 ▲ 84 5 24	256 <1 106 3 690 1437 728 876 2895 bistory2 86 3 20 bistory2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base	21 0 68 <1 1020 1148 1124 1340 4031 <u>current</u> 11 2 2 2 <u>current</u> 0.1	268 0 109 3 687 1535 727 877 2885 history1 ▲ 84 5 24 24 history1 0.2	256 <1 106 3 690 1437 728 876 2895 history2 86 3 20 history2 0.2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <i>limit/base</i> >25 >158 >20 <i>limit/base</i> >4 >20	21 0 68 <1 1020 1148 1124 1340 4031 <i>current</i> 11 2 2 2 <i>current</i> 0.1 4.8	268 0 109 3 687 1535 727 877 2885 history1 ▲ 84 5 24 5 24 bistory1 0.2 7.7	256 <1 106 3 690 1437 728 876 2895 history2 ▲ 86 3 20 history2 0.2 7.2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >4 >20 >30 imit/base	21 0 68 <1 1020 1148 1124 1340 4031 current 11 2 2 2 current 0.1 4.8 18.0	268 0 109 3 687 1535 727 877 2885 bistory1 ▲ 84 5 24 bistory1 0.2 7.7 24.0	256 <1 106 3 690 1437 728 876 2895 bistory2 ▲ 86 3 20 bistory2 0.2 7.2 23.9
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAD	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	250 10 100 450 3000 1150 1350 4250 imit/base >25 >158 >20 imit/base >4 >20 >30 imit/base	21 0 68 <1 1020 1148 1124 1340 4031 <i>current</i> 11 2 2 <i>current</i> 0.1 4.8 18.0	268 0 109 3 687 1535 727 877 2885 bistory1 ▲ 84 5 24 24 0.2 10.2 7.7 24.0	256 <1 106 3 690 1437 728 876 2895 bistory2 ▲ 86 3 20 bistory2 0.2 7.2 23.9



Base

Abnormal

Jul28/23

(100°C) 14 (100°C) 12 12

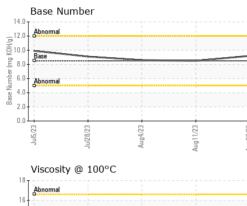
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Jul5/23

OIL ANALYSIS REPORT

VISUAL



	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
Aug11/23	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
		scalar	*Visual	NORML	NORML	NORML	NORML
Aug1	Appearance Odor	scalar	*Visual	NORML	NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
	Free Water	scalar	*Visual	20.L	NEG	NEG	NEG
	FLUID PROPI		method	limit/base	current	history1	history
	Visc @ 100°C	cSt	ASTM D445		14.0	▲ 9.9	▲ 9.9
	GRAPHS						
	Ferrous Alloys						
1/23	25 - iron		-				
Aug11/23	20 -		$\langle \rangle$				
	<u>a</u> 15-						
	10-						
	5 -						
	0						
	Jul5/23	4/23	/23	2/23			
	Jul5/23 Jul28/23	Aug4/23	Aug11/23	Aug22/23			
	Non-ferrous Meta	als	4	4			
	90 T		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
	80 - copper						
	70 tin	/					
	60						
	E 30 T						
	E 50-		· · · · · · · · · · · · · · · · · · ·				
	¹⁰ d 40 30						
	30 20 10			\backslash			
		23	53	33			
		Aug4/23	ug11/23	1022/23			
	2 0 0 20 0 0 E2/92InF	Aug4/23	Aug11/23	Aug22/23			
			Aug11/23		Base Numbe	ir	
	Viscosity @ 100°		Aug11/23	14.0		ir	
	مال المحمد المحم المحمد المحمد المحمد محمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد محمد محمد المحمد ال		Aug 11/23	14.0		ır	
	Viscosity @ 100°		Aug 11/23	14.0	Abnormal	:۲	
	Viscosity @ 100°		Aug11/23	14.0	0 - Abnormal 0 - Base	: Г	
	Viscosity @ 100°		Aug11/23	14.0	Abnormal Base	:F	
	Viscosity @ 100° 18 17 Abnomal 16 15 Base 014 4000013 40 Abnomal 17		Aug11/23	14.0	Abnormal Base Abnormal	: F	
	Viscosity @ 100° 10 0 Viscosity @ 100° 18 16 16 16 Base 014 400013 30 12 11 10		Aug11/23	14.0 12.0 10.0 HOX Bul Jack Wrwn	Abnormal Base Abnormal	۲ 	
	Viscosity @ 100° 10 10 10 10 10 10 10 10 10 10	C	_/	14.0 12.0 (0)H10.0 bul ba bul ba ba bul ba bul ba bul ba bul ba ba ba ba ba ba ba ba ba ba ba ba ba b	Abnormal Base Abnormal		
	Viscosity @ 100° 10 10 10 10 10 10 10 10 10 10	C	_/	14.0 12.0 (PHO) Bull B 8.0 B 8	Abnormal Base Abnormal		1/23
	Viscosity @ 100° Viscosity @ 100° Viscosity @ 100° Base 00113 4000		_/	14.0 12.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(110.0 (0)(10.0)(10.0 (0)(10.0)	Abnormal Base Abnormal Abnormal	.L.	Aug 11/23
	Viscosity @ 100° 10 10 10 10 10 10 10 10 10 10	C	Aug11/23	14.0 12.0 (PHO) Bull B 8.0 B 8	Abnormal Base Abnormal		Aug 11/23
Laborator	Viscosity @ 100° Viscosity @	C EZI-biny 501 Madis	ezili duy son Ave., Ca	14.0 12.0 10/H00,0 bul) as 0.0 10/H00,0 bul) as 0.0		EZipbny nvironmental -	166 - Phenix (
R Sample N	Viscosity @ 100° Viscosity @ 100° 16 16 16 10 16 10 10 10 10 10 10 10 10 10 10	C EZI-biny 501 Madis Received	son Ave., Ca	14.0 12.0 10,10,0 10,		EZipbny nvironmental -	166 - Phenix (Old Brickyard
B Sample N Lab Numb	ry : WearCheck USA - GFL0087857 : 05934747	C EZUBANY 501 Madis Received Diagnose	son Ave., Ca t : 25 / ed : 25 /	14.0 12.0 10,10,0 10,0		EZipbny nvironmental -	166 - Phenix (Old Brickyard Phenix City,
Sample No Lab Numb	ry : WearCheck USA - 0. : GFL0087857 ber : 10620018	C EZI-biny 501 Madis Received	son Ave., Ca t : 25 / ed : 25 /	14.0 12.0 10,10,0 10,		nvironmental - 18	166 - Phenix (Old Brickyard Phenix City, US 368
Sample No Lab Numb Unique Num Test Pack	ry : WearCheck USA - 0. : GFL0087857 ber : 10620018	C E24bary 501 Madia Received Diagnost	son Ave., Ca d : 25 J ed : 25 J iician : We	14.0 12.0 10,10,0 10,0,		nvironmental - 18	166 - Phenix (Old Brickyard Phenix City,

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Submitted By: DARRIN WRIGHT

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