

OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id **D-232** Component **Diesel Engine** Fluid **PHILLIPS 66 15W40 (--- GAL)**

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor. Please specify the component make and model with your next sample.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

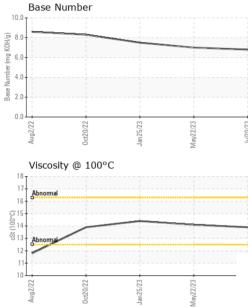
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

		Aug2022	0ct2022	Jan2023 May2023	Jul2023	
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0780335	WC0780346	WC0703722
Sample Date		Client Info		20 Jul 2023	22 May 2023	25 Jan 2023
Machine Age	hrs	Client Info		1957	1696	1367
Oil Age	hrs	Client Info		261	329	255
Oil Changed		Client Info		Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATIO	N	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	9	11	11
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>4	<1	0	<1
Titanium	ppm	ASTM D5185m		4	24	<1
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>20	4	3	3
Lead	ppm	ASTM D5185m	>40	1	2	1
Copper	ppm	ASTM D5185m	>330	<1	1	2
Tin	ppm	ASTM D5185m	>15	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	<1	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 44	history1 52	history2 57
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	44	52	57
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	44 0	52 0	57 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	44 0 94	52 0 70	57 0 80
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	44 0 94 <1	52 0 70 <1	57 0 80 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	44 0 94 <1 56 2447 1104	52 0 70 <1 165	57 0 80 <1 122 2034 1060
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	44 0 94 <1 56 2447	52 0 70 <1 165 2226 1074 1299	57 0 80 <1 122 2034 1060 1235
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	limit/base	44 0 94 <1 56 2447 1104	52 0 70 <1 165 2226 1074	57 0 80 <1 122 2034 1060
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	limit/base	44 0 94 <1 56 2447 1104 1316	52 0 70 <1 165 2226 1074 1299	57 0 80 <1 122 2034 1060 1235
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 ASTM D5185m		44 0 94 <1 56 2447 1104 1316 4625	52 0 70 <1 165 2226 1074 1299 4268	57 0 80 <1 122 2034 1060 1235 3452
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 ASTM D5185m	limit/base	44 0 94 <1 56 2447 1104 1316 4625 current	52 0 70 <1 165 2226 1074 1299 4268 history1	57 0 80 <1 122 2034 1060 1235 3452 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	limit/base	44 0 94 <1 56 2447 1104 1316 4625 current 4	52 0 70 <1 165 2226 1074 1299 4268 history1 4	57 0 80 <1 122 2034 1060 1235 3452 history2 5
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 method ASTM D5185m	limit/base	44 0 94 <1 56 2447 1104 1316 4625 current 4 2	52 0 70 <1 165 2226 1074 1299 4268 history1 4 <1	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3
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	limit/base >25 >20	44 0 94 <1 56 2447 1104 1316 4625 current 4 2 0	52 0 70 <1 165 2226 1074 1299 4268 history1 4 < 2	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3 3 1
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	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base	44 0 94 <1 56 2447 1104 1316 4625 current 4 2 0 0	52 0 70 <1 165 2226 1074 1299 4268 history1 4 <1 2 history1	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3 3 1 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	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3	44 0 94 <1 56 2447 1104 1316 4625 <u>current</u> 4 2 0 <u>current</u>	52 0 70 <1 165 2226 1074 1299 4268 history1 4 <1 2 history1 0.6	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3 3 1 history2 0.4
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	limit/base >25 >20 limit/base >3 >20	44 0 94 <1 56 2447 1104 1316 4625 current 4 2 0 current 0.5 10.2	52 0 70 <1 165 2226 1074 1299 4268 history1 4 <1 2 history1 0.6 10.7	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3 3 1 history2 0.4 10.3
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 D5185m	Imit/base >25 >20 Imit/base >3 >20 >3 >20 >30	44 0 94 <1 56 2447 1104 1316 4625 <u>current</u> 4 2 0 <u>current</u> 0.5 10.2 19.6	52 0 70 <1 165 2226 1074 1299 4268 history1 4 <1 2 history1 0.6 10.7 21.6	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3 3 1 history2 0.4 10.3 19.4
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	limit/base >25 >20 limit/base >3 >20 >30 >30	44 0 94 <1 56 2447 1104 1316 4625 <i>current</i> 4 2 0 <i>current</i> 0.5 10.2 19.6	52 0 70 <1 165 2226 1074 1299 4268 history1 4 4 <1 2 history1 0.6 10.7 21.6 history1	57 0 80 <1 122 2034 1060 1235 3452 history2 5 3 3 1 history2 0.4 10.3 19.4 history2



OIL ANALYSIS REPORT

VISUAL



		VISUAL		methoa	iimit/base		nistory i	nistory∠
		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
Jan 25/23 -	lay22/23 . Jul20/23 .	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Jan 2	May22/23 Jul20/23	Odor	scalar	*Visual	NORML	NORML	NORML	NORML
		Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
		Free Water	scalar	*Visual		NEG	NEG	NEG
		FLUID PROPERT	TIES	method	limit/base	current	history1	history2
		Visc @ 100°C	cSt	ASTM D445		13.9	14.1	14.4
		GRAPHS						
		Ferrous Alloys						
Jan 25/23	May22/23 -	40 - iron 35 - iron iron 35 - iron						
Jar	May	30						
		E ²⁵ ₂₀		 				
		15						
		5-						
			~		~			
		Aug2/22 0ct20/22	Jan 25/23	May22/23	Jul20/23			
		⊲ ँ Non-ferrous Metal	,	Ma	-r			
		⁷⁰ T						
		60 - copper						
		50 - 50 - 50 - 50 - 50 - 50 - 50 - 50 -						
		40						
		40 30		 				
		20						
		23 0 23 0	/23 -	//23	123			
		Aug2/22 0ct20/22	Jan 25/23	May22/2	Jul20/23			
		Viscosity @ 100°C		_		Base Number		
		18			9.			
		Abnormal				1		
		o ¹⁵			HOX 6.	0		
		(J-001) 14 13 13 13			<u></u> 5.	0-		
		Abnormat			-q.4.	0-		
		12			.1. 1.6. 1.6. 1.5. 1.5. 1.5. 1.5. 1.5. 1			
		11			1.			
		10	~	~			m	~
		Aug2/22 0ct20/22	Jan 25/23	May22/23	Jul20/23	Aug2/22 0ct20/22	Jan 25/23	May22/23
		A. O.	Jai	Ma	J.	A. O.	Lai	Ma
	Laboratory	: WearCheck USA - 5	501 Madi	son Ave Ca	rv NC 2751	3	п	UKE LAZZAF
4	Sample No.		Receive		Jul 2023	0		ETTEVILLE F
TAP	Lab Number		Diagnos		Jul 2023			RALEIGH, N
TAB					US 2760			
	Unique Number		Diagnos		s Davis			
Cate L2367	Unique Number Test Package		Tests: T	BN)			Conta DIXON@DUK	ct: NICK DIXC

Contact/Location: NICK DIXON - DUKRAL