

OIL ANALYSIS REPORT

Sample Rating Trend





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.

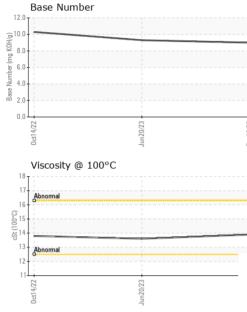
Fluid Condition

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

		Oct	2022	Jun2023 Dec20	123			
SAMPLE INFORM	IATION	method	limit/base	current	history1	history2		
Sample Number		Client Info		WC0860955	WC0793395	WC0692499		
Sample Date		Client Info		19 Dec 2023	20 Jun 2023	14 Oct 2022		
Machine Age	hrs	Client Info		2303	2246	2178		
Oil Age	hrs	Client Info		0	48	0		
Oil Changed		Client Info		Not Changd	Changed	Not Changd		
Sample Status				NORMAL	NORMAL	NORMAL		
CONTAMINATION	٧	method	limit/base	current	history1	history2		
Fuel		WC Method	>5	<1.0	<1.0	<1.0		
Water		WC Method	>0.2	NEG	NEG	NEG		
Glycol		WC Method		NEG	NEG	NEG		
WEAR METALS		method	limit/base	current	history1	history2		
Iron	ppm	ASTM D5185m	>100	4	16	13		
Chromium	ppm	ASTM D5185m	>20	<1	2	2		
Nickel	ppm	ASTM D5185m	>4	0	1	0		
Titanium	ppm	ASTM D5185m		65	<1	<1		
Silver	ppm	ASTM D5185m	>3	0	0	0		
Aluminum	ppm	ASTM D5185m	>20	2	5	4		
Lead	ppm	ASTM D5185m	>40	0	0	<1		
Copper	ppm	ASTM D5185m	>330	4	<1	<1		
Tin	ppm	ASTM D5185m	>15	<1	<1	<1		
Vanadium	ppm	ASTM D5185m		<1	0	0		
Cadmium	ppm	ASTM D5185m		0	0	0		
ADDITIVES		method	limit/base	current	history1	history2		
Boron	ppm	ASTM D5185m		130	87	83		
				0	0	0		
Barium	ppm	ASTM D5185m		-	0	0		
Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m		0	3	2		
				0 <1				
Molybdenum	ppm	ASTM D5185m		-	3	2		
Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m		<1	3 <1	2 <1		
Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m		<1 446	3 <1 579	2 <1 549		
Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 446 1767	3 <1 579 1891	2 <1 549 1864		
Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 446 1767 1106	3 <1 579 1891 1135	2 <1 549 1864 1049		
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	limit/base	<1 446 1767 1106 1282	3 <1 579 1891 1135 1342	2 <1 549 1864 1049 1305		
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		<1 446 1767 1106 1282 4021	3 <1 579 1891 1135 1342 4094	2 <1 549 1864 1049 1305 4496		
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		<1 446 1767 1106 1282 4021 current	3 <1 579 1891 1135 1342 4094 history1	2 <1 549 1864 1049 1305 4496 history2		
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>25	<1 446 1767 1106 1282 4021 current 10	3 <1 579 1891 1135 1342 4094 <u>history1</u> 12	2 <1 549 1864 1049 1305 4496 history2 12		
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>25	<1 446 1767 1106 1282 4021 current 10 2	3 <1 579 1891 1135 1342 4094 history1 12 3	2 <1 549 1864 1049 1305 4496 history2 12 4		
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	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	>25 >20	<1 446 1767 1106 1282 4021 current 10 2 4	3 <1 579 1891 1135 1342 4094 history1 12 3 3 3	2 <1 549 1864 1049 1305 4496 history2 12 4 1		
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 ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>25 >20 limit/base	<1 446 1767 1106 1282 4021 current 10 2 4 Current	3 <1 579 1891 1135 1342 4094 history1 12 3 3 3	2 <1 549 1864 1049 1305 4496 history2 12 4 1 1 history2		
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	>25 >20 limit/base >3	<1 446 1767 1106 1282 4021 current 10 2 4 current 0.1	3 <1 579 1891 1135 1342 4094 history1 12 3 3 3 history1 0.3	2 <1 549 1864 1049 1305 4496 history2 12 4 1 1 history2 0.3		
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	>25 >20 limit/base >3 >20	<1 446 1767 1106 1282 4021 current 10 2 4 current 0.1 6.9 19.1	3 <1 579 1891 1135 1342 4094 history1 12 3 3 3 history1 0.3 9.4	2 <1 549 1864 1049 1305 4496 history2 12 4 1 1 history2 0.3 9.6		
Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7624 *ASTM D7415	>25 >20 limit/base >3 >20 >30 limit/base	<1 446 1767 1106 1282 4021 current 10 2 4 current 0.1 6.9 19.1 current	3 <1 579 1891 1135 1342 4094 history1 12 3 3 3 history1 0.3 9.4 21.1 history1	2 <1 549 1864 1049 1305 4496 history2 12 4 1 1 history2 0.3 9.6 22.1 history2		
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	>25 >20 limit/base >3 >20 >30 limit/base	<1 446 1767 1106 1282 4021 current 10 2 4 current 0.1 6.9 19.1	3 <1 579 1891 1135 1342 4094 history1 12 3 3 history1 0.3 9.4 21.1	2 <1 549 1864 1049 1305 4496 history2 12 4 1 1 history2 0.3 9.6 22.1		



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	VISUAL		method	limit/base	е			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
Jun 20/23 Dec 19/23	Appearance	scalar	*Visual	NORML		NORML	NORML	NORML
Jun	Odor	scalar	*Visual	NORML		NORML	NORML	NORML
	Emulsified Water	scalar	*Visual	>0.2		NEG	NEG	NEG
	Free Water	scalar	*Visual			NEG	NEG	NEG
	FLUID PROPERTI	ES	method	limit/base	е	current	history1	history2
	Visc @ 100°C	cSt	ASTM D445			13.9	13.6	13.8
	GRAPHS							
	Iron (ppm)				100 -	Lead (ppm)		
53	200 - Severe	1			80	Severe		
Jun20/23					60			
	E 150 100 - Abnormal			udd	40	Abnormal		
	50 -				20-			
				_	0			
	0ct14/22	Jun20/23		Dec19/23		0ct14/22	Jun20/23	
	-	ηη		De				
	Aluminum (ppm)				50 T	Chromium (pp	im)	
	40 - Severe				40-	Severe		
	g 20 Abnormal				30-			
	읍 20 - Abnormal			6	30 - 20 -	Abnormal		
	10-				10			
				33	0 L	12		
	0ct14/22	Jun20/23		Dec19/23		0ct14/22	Jun20/23	
	∝ Copper (ppm)	Γ,		Q		□ Silicon (ppm)	ĥ	
	400 Severe			, -	⁸⁰ T	Severe		
	300				60-	1		
	톱 200-			8	40-			
				-	20	Abnormal		
	100-				20-			
	04	23		23	01			
	0ct14/22	Jun20/23		Dec19/23		0ct14/22	Jun20/23	
	Viscosity @ 100°C	7				Base Number	7	
	Abnormal				12.0 10.0	1		
	16			lo ko	8.0			
	් 0014- ජ්ය Abnormal			ber (m	6.0			
	ਲੋਂ 12 - Abnormal			Z	4.0			
	10			Base	2.0			
	0ct14/22	Jun20/23		Dec19/23		0ct14/22	Jun20/23	
	Oct	Juni		Dec		0ct	Juni	
Laboratory Sample No. Lab Number Unique Number Test Package	: 06056360 D r : 10822309 D	lecieveo Jiagnos Jiagnos	d :10. ed :11. tician :Wes	ry, NC 275 Jan 2024 Jan 2024 s Davis	513	3003 W (CASINO RD BLI	SA - EVERET DG 40-26 DR S EVERETT, W S 98204-191 t: TIM FELLE

Contact/Location: TIM FELLER - AESEVE