

OIL ANALYSIS REPORT

Area Plymouth & Brockton 434

Component Diesel Engine Fluid DIESEL ENGINE OIL SAE 40 (36 QTS)

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 Rating Trend



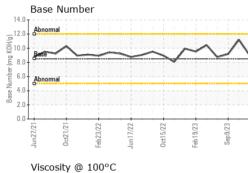
NORMAL

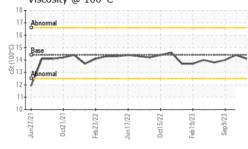
un2021 Oct2021 Feb2022 Jun2022 Oct2022 Feb2023 Sep2023

SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PCA0090723	PCA0083329	PCA0083324
Sample Date		Client Info		02 Nov 2023	30 Sep 2023	09 Sep 2023
Machine Age	mls	Client Info		257776	244982	239389
Oil Age	mls	Client Info		12000	24000	24000
Oil Changed		Client Info		Not Changd	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL
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	>90	7	2	15
Chromium	ppm	ASTM D5185m	>20	<1	<1	1
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m	>2	0	0	0
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>20	<1	<1	0
Lead	ppm	ASTM D5185m	>40	0	0	0
Copper	ppm	ASTM D5185m	>330	0	0	0
Tin	ppm	ASTM D5185m	>15	0	0	0
Vanadium	ppm	ASTM D5185m		0	0	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 4	history1 2	history2 3
	ppm ppm					
Boron		ASTM D5185m	250	4	2	3
Boron Barium Molybdenum Manganese	ppm	ASTM D5185m ASTM D5185m	250 10	4 0	2 0	3
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	4 0 57	2 0 57	3 0 60
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	4 0 57 0	2 0 57 <1	3 0 60 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	4 0 57 0 884 1066 912	2 0 57 <1 977 1048 1041	3 0 60 <1 1032 1231 1054
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	250 10 100 450 3000 1150 1350	4 0 57 0 884 1066 912 1215	2 0 57 <1 977 1048 1041 1270	3 0 60 <1 1032 1231 1054 1364
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	250 10 100 450 3000 1150	4 0 57 0 884 1066 912	2 0 57 <1 977 1048 1041	3 0 60 <1 1032 1231 1054
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	250 10 100 450 3000 1150 1350 4250	4 0 57 0 884 1066 912 1215 2926 current	2 0 57 <1 977 1048 1041 1270 3173 history1	3 0 60 <1 1032 1231 1054 1364
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	4 0 57 0 884 1066 912 1215 2926	2 0 57 <1 977 1048 1041 1270 3173	3 0 60 <1 1032 1231 1054 1364 3875
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN 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	250 10 100 450 3000 1150 1350 4250 limit/base >25 >216	4 0 57 0 884 1066 912 1215 2926 current 3 <1	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	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	4 0 57 0 884 1066 912 1215 2926 current 3	2 0 57 <1 977 1048 1041 1270 3173 history1 2	3 0 60 <1 1032 1231 1054 1364 3875 history2 4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >216 >20 limit/base	4 0 57 0 884 1066 912 1215 2926 current 3 <1 0	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1 0 history1	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0 0 0
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 ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >216 >216 >20 limit/base	4 0 57 0 884 1066 912 1215 2926 <u>current</u> 3 <1 0 <u>current</u>	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1 0 history1 0.5	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0 0 0 history2 1.5
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 TS ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >216 >20 limit/base >6 >20	4 0 57 0 884 1066 912 1215 2926 <i>current</i> 3 <1 0 <i>current</i> 1.4 8.3	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1 0 history1 0.5 5.8	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0 0 0 history2 1.5 9.2
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 ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 limit/base >25 >216 >216 >20 limit/base	4 0 57 0 884 1066 912 1215 2926 <u>current</u> 3 <1 0 <u>current</u>	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1 0 history1 0.5	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0 0 0 history2 1.5
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 limit/base >25 >216 >20 limit/base >6 >20	4 0 57 0 884 1066 912 1215 2926 <i>current</i> 3 <1 0 <i>current</i> 1.4 8.3	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1 0 history1 0.5 5.8	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0 0 0 history2 1.5 9.2
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 limit/base >25 >216 >20 limit/base >6 >20	4 0 57 0 884 1066 912 1215 2926 <u>current</u> 3 <1 0 <u>current</u> 1.4 8.3 21.1	2 0 57 <1 977 1048 1041 1270 3173 history1 2 <1 0 history1 0.5 5.8 18.5	3 0 60 <1 1032 1231 1054 1364 3875 history2 4 0 0 0 history2 1.5 9.2 21.7



OIL ANALYSIS REPORT





		VISUAL		method	limit/base	current	histo	ry1	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	
2	m m	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE		NONE	
Jun17/22 Oct15/22	Feb 19/23 Sep 9/23	Appearance	scalar	*Visual	NORML	NORML	NORM		NORML	
۹۲ O	a	Odor	scalar	*Visual	NORML	NORML	NORM	IL	NORML	
	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG		NEG		
		Free Water	scalar	*Visual		NEG	NEG		NEG	
		FLUID PROPE		method	limit/base		histo	ry1	history2	
	\sim	Visc @ 100°C	cSt	ASTM D445	14.4	14.1	14.4		14.0	
		GRAPHS								
		Iron (ppm)				Lead (ppm)			
22	23	200 Severe				80 Severe				
Jun17/22 Oct15/22	Feb 19/23 Sep 9/23	200				60 -				
- U	L	E 150 100 - Abnormal			<u>d</u>	40 - Abnormal				
		50-			2	20 -				
			2			0	2 2	2	n n	
		Jun27/21 0ct21/21 Feb23/22	Jun17/22 Oct15/22	Feb 19/23		Jun27/21 0ct21/21	Feb23/22 Jun17/22	0ct15/22	Feb 19/23 Sep 9/23	
			'n î	ιΞ °	-	,	,	0	L VI	
		Aluminum (ppm)				Chromium	(hhill)			
		40 - Severe				40 - Severe				
		20 - Abnormal			udd	30				
		10				10				
		3/22	7/22	eb 19/23 +	23/0	1/21	3/22	5/22	eb 19/23	
		Jun27/21 Oct21/21 Feb23/22	Jun17/22 Oct15/22	Feb19/23	5	Jun27/21 0ct21/21	Feb23/22 Jun17/22	0ct15/22	Feb 19/23 Sep 9/23	
		Copper (ppm)				Silicon (ppr	n)			
		400 Severe				80 Severe				
		300 -				60 -				
		톱 200 -			튭	40 - Abnormal				
		100			2	20 - Abnormal				
			2				2	2		
		Jun27/21 0ct21/21 Feb23/22	Jun 17/22 Oct15/22	Feb 19/23	2 /0 /c	Jun27/21 0ct21/21	Feb23/22 Jun17/22	0ct15/22	Feb 19/23 Sep 9/23	
		ع مد Viscosity @ 100°(,	щ° с	·	⊰ ∘ Base Numł		Ō	£ 0	
		18 T 3			15					
		Abnormal			KOH/g	Abnormal				
		16 Base 14 Apnormal			Base Number (mg KOH/g)	Base		~	\sim	
		경 12 - P			qmn _N 5	0 - Abnormal				
		10			Base	.0				
		Jun27/21	Jun17/22	Feb19/23 -		Jun27/21	Feb23/22 -	0ct15/22	Feb19/23 - Sep9/23 -	
		Juní Oct2 Feb2	Jun1 Oct1	Feb1	2	Juní Oct2	Feb2 Jun1	0ct1	Sep Sep	
	Laboratory Sample No. Lab Number Unique Number	: WearCheck USA - 501 Madi : PCA0090723 Received : 06001768 Diagnos : 10735530 Diagnos		: 08 Nov 2023 d : 10 Nov 2023			8 INE	PLYMOUTH & BROCKTO 8 INDUSTRIAL PARK R PLYMOUTH, M US 0236 Contact: Donald Polym		
		contact Customer Serv		800-237-1369. cope of accreditation.				Contact: Donald Pelpqui Dpeloquin@P-B.cor T: (508)732-603		

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Ē

F: (508)732-6091