

# **OIL ANALYSIS REPORT**

#### Sample Rating Trend





#### Component Diesel Engine Fluid DIESEL ENGINE OIL SAE 10W30 (--- 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.

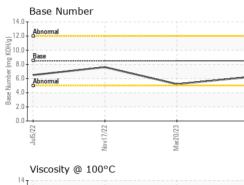
## Fluid Condition

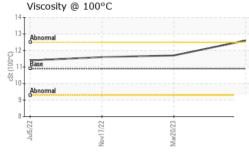
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFOR		method	limit/base	current	history1	history2
			mmubase			
Sample Number		Client Info		PCA0102184	PCA0092496	PCA0084941
Sample Date		Client Info		08 Aug 2023	20 Mar 2023	17 Nov 2022
Machine Age	mls	Client Info		124071	124071	0
Oil Age	mls	Client Info		124071	124071	0
Oil Changed		Client Info		Changed	Changed	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<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	>100	32	55	16
Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Nickel	ppm	ASTM D5185m	>4	0	<1	<1
Titanium	ppm	ASTM D5185m		<1	<1	<1
Silver	ppm	ASTM D5185m	>3	<1	0	<1
Aluminum	ppm	ASTM D5185m	>20	8	12	3
Lead	ppm	ASTM D5185m	>40	<1	<1	<1
Copper	ppm	ASTM D5185m	>330	3	4	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				history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 6	history1 3	history2 9
	ppm ppm					
Boron		ASTM D5185m	250	6	3	9
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	6 1	3 0	9 0
Boron Barium Molybdenum	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	6 1 67	3 0 58	9 0 54
Boron Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	6 1 67 1	3 0 58 2	9 0 54 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	6 1 67 1 914	3 0 58 2 947	9 0 54 <1 911
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450 3000	6 1 67 1 914 1181	3 0 58 2 947 1251	9 0 54 <1 911 1161
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	6 1 67 1 914 1181 987	3 0 58 2 947 1251 993	9 0 54 <1 911 1161 954
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	6 1 67 1 914 1181 987 1251	3 0 58 2 947 1251 993 1297	9 0 54 <1 911 1161 954 1196
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 Limit/base	6 1 67 1 914 1181 987 1251 3194	3 0 58 2 947 1251 993 1297 2861	9 0 54 <1 911 1161 954 1196 3461
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	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	250 10 100 450 3000 1150 1350 4250 Limit/base	6 1 67 1 914 1181 987 1251 3194 current	3 0 58 2 947 1251 993 1297 2861 history1	9 0 54 <1 911 1161 954 1196 3461 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN 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 ASTM D5185m	250 10 100 450 3000 1150 1350 4250 imit/base >25	6 1 67 1 914 1181 987 1251 3194 current 9	3 0 58 2 947 1251 993 1297 2861 history1 11	9 0 54 <1 911 1161 954 1196 3461 history2 8
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 ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	250 10 100 450 3000 1150 1350 4250 imit/base >25	6 1 67 1 914 1181 987 1251 3194 current 9 3	3 0 58 2 947 1251 993 1297 2861 history1 11 2	9 0 54 <1 911 1161 954 1196 3461 <b>history2</b> 8 1
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 <b>limit/base</b> >25 >20 <b>limit/base</b>	6 1 67 1 914 1181 987 1251 3194 current 9 3 14 current	3 0 58 2 947 1251 993 1297 2861 <b>history1</b> 11 2 14 <b>history1</b>	9 0 54 <1 911 1161 954 1196 3461 history2 8 1 4 history2
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 <b>Imit/base</b> >25 >20 <b>Imit/base</b> >3	6 1 67 1 914 1181 987 1251 3194 <u>current</u> 9 3 14 <u>current</u>	3 0 58 2 947 1251 993 1297 2861 history1 11 2 14 14 history1 0.8	9 0 54 <1 911 1161 954 1196 3461 history2 8 1 4 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>i</b> mit/base >25 >20 <b>i</b> mit/base >3 >20	6 1 67 1 914 1181 987 1251 3194 current 9 3 14 current 0.6 9.2	3 0 58 2 947 1251 993 1297 2861 history1 11 2 14 14 history1 0.8 11.1	9 0 54 <1 911 1161 954 1196 3461 history2 8 1 4 4 history2 0.4 10.2
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 <b>imit/base</b> >25 <b>imit/base</b> >3 >20 >30	6 1 67 1 914 1181 987 1251 3194 <u>current</u> 9 3 14 <u>current</u> 0.6 9.2 21.4	3 0 58 2 947 1251 993 1297 2861 history1 11 2 14 history1 0.8 11.1 25.0	9 0 54 <1 911 1161 954 1196 3461 history2 8 1 4 <u>history2</u> 0.4 10.2 22.3
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 D7844 *ASTM D7624	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >20 <b>limit/base</b> >3 >20 >30	6 1 67 1 914 1181 987 1251 3194 current 9 3 14 current 0.6 9.2 21.4 current	3 0 58 2 947 1251 993 1297 2861 history1 11 2 14 14 history1 0.8 11.1 25.0 history1	9 0 54 <1 911 1161 954 1196 3461 history2 8 1 4 4 history2 0.4 10.2 22.3 history2
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 <b>imit/base</b> >20 >30 >20 >30 <b>imit/base</b> >20	6 1 67 1 914 1181 987 1251 3194 <u>current</u> 9 3 14 <u>current</u> 0.6 9.2 21.4	3 0 58 2 947 1251 993 1297 2861 history1 11 2 14 history1 0.8 11.1 25.0	9 0 54 <1 911 1161 954 1196 3461 <b>history2</b> 8 1 4 <b>history2</b> 0.4 10.2 22.3



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	VISUAL		method	limit/base	current	history1	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		*Visual	NONE		NONE	NONE
	Debris	scalar	*Visual		NONE	NONE	NONE
	Sand/Dirt				NONE	NONE	NONE
8/23 -			*Visual				NORML
Aug	Odor	scalar	*Visual		NORML		NORML
	Emulsified Water						NEG
	Free Water	scalar	*Visual		NEG	NEG	NEG
	FLUID PROPI	ERTIES	method	limit/base	current	history1	history2
	Visc @ 100°C	cSt	ASTM D445	10.9	12.6	11.7	11.6
	GRAPHS						
	Ferrous Alloys						
	<sup>60</sup> T						
57/0	50		$\wedge$				
Mar							
	Ē.30	/					
	20						
	10						
	5 5		/23	/23			
	Jul5.		Aar20,	Aug8			
	-	ale	2				
	<sup>10</sup> T						
	copper						
	8 - exercise tin						
	6						
	шdd						
	4						
	2	and the second se					
		and the local division of the local division	and the second s	Courses and data			
	0		23	53			
	Jul5/2		ar20/2	Aug 8/2			
	2	С	Z				
	<sup>14</sup>			14.0	Base Number		
	13 - Abnormal		· J	12.0	Abnormal G		
	12			(0,10.0 8.0 6.0.0 8see Number 8see 4.0	Page		
	(2000) 11- Base			J BE 8.0	Base		
	S.			a E 6.0	Abnormal		
				Nu e	Abnormal		
	10						
	10- Abnormal			2.0-			
	10- Abnormal		Mar20/23	2.0-	Jul5/22	Nov17/22	3
		Precipitate Silt Debris Sand/Dirt Appearance Odor Emulsified Water Free Water Free Water Visc @ 100°C GRAPHS Ferrous Alloys 000 000 C GRAPHS Ferrous Metar C Composition C Composition C Composition C Composition C C C C C C C C C C C C C C C C C C C	Precipitate scalar Silt scalar Debris scalar Appearance scalar Odor scalar Emulsified Water scalar Free Water scalar Free Water scalar Free Water scalar Free Water scalar Free Water scalar Free Water scalar Odor c st GRAPHS Ferrous Alloys Non-ferrous Metals	Precipitate scalar *Visual Silt scalar *Visual Debris scalar *Visual Appearance scalar *Visual Odor scalar *Visual Emulsified Water scalar *Visual Free Water scalar *Visual Non-ferrous Alloys Non-ferrous Metals	Precipitate scalar Visual NONE Sitt scalar Visual NONE Sand/Dirt scalar Visual NONE Sand/Dirt scalar Visual NONE Sand/Dirt scalar Visual NONE Appearance scalar Visual NORML Odor scalar Visual NORML Codor scalar Visual NORML Emulsified Water scalar Visual O.2 Free Water scalar Visual O.2 Free Water scalar Visual J. FLUID PROPERTIES method limit/base Visc @ 100°C cSt ASTM D445 10.9 GRAPHS Ferrous Alloys Non-ferrous Metals 0 0 0 0 0 0 0 0 0 0 0 0 0	Precipitate scalar *Visual NONE NONE Sitt scalar *Visual NONE NONE Sand/Dirt scalar *Visual NONE NONE Appearance scalar *Visual NORML NORML Odor scalar *Visual NORML NO	Precipitate scalar Visual NONE NONE NONE NONE Siti scalar Visual NONE NONE NONE NONE Sanat/Diri scalar Visual NONE NONE NONE NONE Appearance scalar Visual NORML NORML NORML NORML Odor scalar Visual NORML NORML NORML NORML Codor scalar Visual NORML NORML NORML NORML NORME NONE Free Water scalar Visual NORML NORML NORML Visc @ 100°C cst ASTM D445 10.9 12.6 11.7 CRAPHS Ferrous Alloys Mon-ferrous Metals 0 0 0 0 0 0 0 0 0 0 0 0 0

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

\* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Т:

F: