

# **OIL ANALYSIS REPORT**

Sample Rating Trend





### Area (BA535029) {UNASSIGNED} Machine Id MACK 635 Component

1 Diesel Engine

# DIESEL ENGINE OIL SAE 15W40 (--- 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.

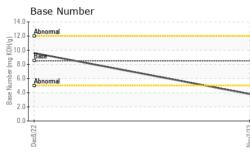
# Fluid Condition

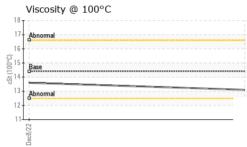
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Number		Client Info		WC0832961	WC0758534	
Sample Date		Client Info		02 Nov 2023	08 Dec 2022	
Machine Age	hrs	Client Info		0	0	
Oil Age	hrs	Client Info		0	0	
Oil Changed		Client Info		Changed	Changed	
Sample Status				NORMAL	NORMAL	
CONTAMINATION	N	method	limit/base	current	history1	history2
Fuel		WC Method	>3.0	<1.0	<1.0	
Glycol		WC Method		NEG	NEG	
WEAR METALS			limit/base	ourront		history?
		method		current	history1	history2
Iron	ppm	ASTM D5185m	>120	18	3	
Chromium	ppm	ASTM D5185m		<1	<1	
Nickel	ppm	ASTM D5185m	>5	<1	<1	
Titanium	ppm	ASTM D5185m		<1	0	
Silver	ppm	ASTM D5185m	>2	0	0	
Aluminum	ppm	ASTM D5185m		2	0	
Lead	ppm	ASTM D5185m	>40	4	<1	
Copper	ppm	ASTM D5185m	>330	<1	4	
Tin	ppm	ASTM D5185m	>15	1	<1	
Vanadium	ppm	ASTM D5185m		<1	0	
Cadmium	ppm	ASTM D5185m		0	0	
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 7	history1 8	history2
	ppm ppm					
Boron		ASTM D5185m	250	7	8	
Boron Barium	ppm	ASTM D5185m ASTM D5185m	250 10	7 0	8 0	
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	250 10	7 0 68	8 0 64	
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100	7 0 68 <1	8 0 64 <1	
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	250 10 100 450	7 0 68 <1 954	8 0 64 <1 886	
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	7 0 68 <1 954 1171	8 0 64 <1 886 1067	   
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	7 0 68 <1 954 1171 1026	8 0 64 <1 886 1067 962	   
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	7 0 68 <1 954 1171 1026 1356	8 0 64 <1 886 1067 962 1175	    
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	7 0 68 <1 954 1171 1026 1356 2726	8 0 64 <1 886 1067 962 1175 3579	
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	250 10 100 450 3000 1150 1350 4250 <i>limit/base</i> >25	7 0 68 <1 954 1171 1026 1356 2726 current	8 0 64 <1 886 1067 962 1175 3579 history1	
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 <b>method</b>	250 10 100 450 3000 1150 1350 4250 <i>limit/base</i> >25	7 0 68 <1 954 1171 1026 1356 2726 2726 current 7	8 0 64 <1 886 1067 962 1175 3579 history1 4	
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 ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158	7 0 68 <1 954 1171 1026 1356 2726 <u>current</u> 7 5	8 0 64 <1 886 1067 962 1175 3579 history1 4 2	     history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	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 >158 >20 <b>Imit/base</b>	7 0 68 <1 954 1171 1026 1356 2726 current 7 5 1 1 current	8 0 64 <1 886 1067 962 1175 3579 history1 4 2 <1 4	     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	250 10 100 450 3000 1150 1350 4250 <b>Iimit/base</b> >25 >158 >20 <b>Iimit/base</b> >2	7 0 68 <1 954 1171 1026 1356 2726 <b>current</b> 7 5 1 1 <b>current</b> 0.4	8 0 64 <1 886 1067 962 1175 3579 history1 4 2 <1 4 2 <1 history1 0.1	     history2   history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	250 10 100 450 3000 1150 1350 4250 <b>Iimit/base</b> >25 >158 >20 <b>Iimit/base</b> >2	7 0 68 <1 954 1171 1026 1356 2726 current 7 5 1 1 current	8 0 64 <1 886 1067 962 1175 3579 history1 4 2 <1 4	     history2   history2
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	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >158 >20 <b>imit/base</b> >4 >20	7 0 68 <1 954 1171 1026 1356 2726 <b>current</b> 7 5 1 1 <b>current</b> 0.4 12.1 26.5	8 0 64 <1 886 1067 962 1175 3579 history1 4 2 <1 4 2 <1 0.1 7.4 20.6	     history2  history2  history2
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 D7624	250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20 <b>limit/base</b> >4 >20 >30 <b>limit/base</b>	7 0 68 <1 954 1171 1026 1356 2726 <i>current</i> 7 5 1 <i>current</i> 0.4 12.1 26.5	8 0 64 <1 886 1067 962 1175 3579 history1 4 2 <1 4 2 <1 history1 0.1 7.4 20.6 history1	     history2  history2  history2  history2
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	250 10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >158 >20 <b>imit/base</b> >4 >20	7 0 68 <1 954 1171 1026 1356 2726 <b>current</b> 7 5 1 1 <b>current</b> 0.4 12.1 26.5	8 0 64 <1 886 1067 962 1175 3579 history1 4 2 <1 4 2 <1 0.1 7.4 20.6	     history2  history2  history2



# **OIL ANALYSIS REPORT**





		-	VISUAL		method	limit/base	current	history1	history2
		W	Vhite Metal	scalar	*Visual	NONE	NONE	NONE	
		Y	ellow Metal	scalar	*Visual	NONE	NONE	NONE	
		P	recipitate	scalar	*Visual	NONE	NONE	NONE	
			ilt	scalar	*Visual	NONE	NONE	NONE	
		D	ebris	scalar	*Visual	NONE	NONE	NONE	
			and/Dirt	scalar	*Visual	NONE	NONE	NONE	
	- 50/2/m		ppearance	scalar	*Visual	NORML	NORML	NORML	
	Nov.	<sup>700</sup> 0	)dor	scalar	*Visual	NORML	NORML	NORML	
			mulsified Water	scalar	*Visual	>0.2	NEG	NEG	
			ree Water	scalar	*Visual		NEG	NEG	
			FLUID PROPERT	TIES	method	limit/base	current	history1	history2
		V	/isc @ 100°C	cSt	ASTM D445	14.4	13.1	13.6	
			GRAPHS						
			Ferrous Alloys						
		<sup>18</sup> т	Terrous Alloys						
		16-	iron						
		14-	nickel						
		12-							
		E <sup>10</sup>							
		<sup>d</sup> 8-							
		6 -							
		4							
		2							
		n I							
		0-	/22			/23			
			Dec8/22			Nov2/23			
						-			
			Non-ferrous Meta	ls					
		10 T							
			conner						
			copper						
		8-							
		8-	nananananan lead						
		6 -	nananananan lead						
		8 - 6 - udd 4 -	nananananan lead						
		6 -	nananananan lead						
		6 -	nananananan lead		NAME & COLONY & COLONY & COLONY				
		6 - Wdd 4 -	nananananan lead		59944414493774444447777444				
		6 - Ed. 4 - 2 -	ead the second s		999444 1 ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (				
		6 - Ed. 4 - 2 -	ead the second s			2/23			
		6 - Ed. 4 - 2 -	nananananan lead			Nov2223			
		6 + 4 - 2 - 0 -	ead the second s			Nov2/23	Base Numbe	er.	
		6 - E 4 - 2 - 0 -	Viscosity @ 100°C			14.0	I	2r	
		6 - 8 - 2 - 0 -				14.0		9r	
		6 - 4 - 2 - 0 -	Viscosity @ 100°C			14.0	I	er	
		6 - 4 - 2 - 0 -	Viscosity @ 100°C			14.0	I	er	
		6 - 8 - 2 - 0 -	Viscosity @ 100°C			14.0	Abnormal Base	er	
		18 T 17 T 16 T 15 T 14 T	Viscosity @ 100°C			14.0	I	er	
		18 - 2 - 0 - 18 - 17 - 16 - (0,001)13; 14 - 13 -	Viscosity @ 100°C			14.0 12.0 H 10.0 But 8.0 bqu 6.0 88 4.0	Abnormal Base	er	
		18 T 17 T 16 T 15 T 14 T	Viscosity @ 100°C			14.0	Abnormal Base	er	
		18 17 16 (	Line Constraints and Constrain			14.0 12.0 (0) 10.0 Hoy Be 8.0 Be 6.0 Be 4.0 2.0 0,0	Abnormal Base	9r	
		18 17 16 (	Line Constraints and Constrain			14.0 12.0 (0) 10.0 Hoy Be 8.0 Be 6.0 Be 4.0 2.0 0,0	Abnormal Base	2r	
		18 17 16 (	Viscosity @ 100°C			14.0 12.0 (Philo.0 Builting 6.0 2.0	Abnormal Base	2r	
		18 17 16 (	Line Constraints and Constrain			14.0 12.0 (0) 10.0 Hoy Be 8.0 up 6.0 ge 4.0 2.0 0.0	Abnormal Base	2r	
, ,	Laboratorv	18 - 2 - 0 - 18 - 17 - 16 - 17 - 16 - 13 - 13 - 11 -	Viscosity @ 100°C		son Ave Ca	14.0 12.0 (0)HOX BOU BUU BUU BUU BUU BUU BUU BUU BUU BUU	Abnormal Base Abnormal		ste - Corpora
	Laboratory Sample No.	18 - 2 - 0 - 18 - 17 - 16 - 17 - 16 - 13 - 12 - 11 - 11 -	Viscosity @ 100°C			14.0 12.0 12.0 12.0 12.0 12.0 14.0 12.0 14.0 12.0 10.0	Abnormal Base Abnormal	Apple Valley Was	
	Laboratory Sample No. Lab Number	18 - 2 - 0 - 18 - 17 - 16 - (0,001)) 13 - 13 - 12 - 11 - 11 - 11 - 11 - 11 - 11 - 11	Abnormal Abnorm	501 Madia	d :03 l	14.0 12.0 (0)HOX BOU BUU BUU BUU BUU BUU BUU BUU BUU BUU	Abnormal Base Abnormal	Apple Valley Was	ames Burr Bl
	Sample No. Lab Number	18 17 16 17 16 17 16 13 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 11 12 12	Abnormal Abnorm	501 Madia Received Diagnos	d : 03   ed : 06	14.0 12.0 12.0 10.0	Abnormal Base Abnormal	Apple Valley Was	ames Burr Bl arneysville, V
	Sample No.	18 17 16 0 18 17 16 17 16 12 11 11	Abnormal Abnorm	501 Madia Received Diagnos Diagnos	d : 03   ed : 06   tician : Dor	14.0 12.0 12.0 14.0 12.0 10.0	Abnormal Base Abnormal	Apple Valley Was 771 J. Kea	ames Burr Bl

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

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

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