

# **OIL ANALYSIS REPORT**

Sample Rating Trend



Action Newark CATERPILLAR 5598 Diesel Engine

Fluid DIESEL ENGINE OIL SAE 15W40 (--- GAL)

SAMPLE INFORMATION method

### Recommendation

DIAGNOSIS

Resample at the next service interval to monitor.

Area

#### 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 Number		Client Info		WC0912331	WC0863142	WC0745258
Sample Date		Client Info		04 May 2024	19 Oct 2023	24 May 2023
Machine Age	hrs	Client Info		0	20881	20177
Oil Age	hrs	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	J	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	32	11	6
Chromium	ppm	ASTM D5185m	>20	1	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	<1	<1
Titanium	ppm	ASTM D5185m	>2	<1	<1	<1
Silver	ppm	ASTM D5185m	>2	0	0	<1
Aluminum	ppm	ASTM D5185m	>25	9	7	<1
Lead	ppm	ASTM D5185m	>40	0	<1	0
Copper	ppm	ASTM D5185m	>330	3	2	<1
Tin	ppm	ASTM D5185m	>15	0	3	<1
Vanadium	ppm	ASTM D5185m		0	<1	<1
Cadmium	ppm	ASTM D5185m		0	<1	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base 250	current 0	history1 17	history2 18
ADDITIVES Boron Barium	ppm ppm	method ASTM D5185m ASTM D5185m	limit/base 250 10	current O O	history1 17 0	history2 18 0
ADDITIVES Boron Barium Molybdenum	ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100	current 0 0 63	history1 17 0 57	history2 18 0 64
ADDITIVES Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100	current 0 0 63 <1	history1 17 0 57 0	history2 18 0 64 <1
ADDITIVES Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100 450	current 0 0 63 <1 901	history1 17 0 57 0 840	history2 18 0 64 <1 836
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100 450 3000	current           0           63           <1           901           1334	history1 17 0 57 0 840 1043	history2 18 0 64 <1 836 1361
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100 450 3000 1150	Current 0 63 <1 901 1334 1025	history1 17 0 57 0 840 1043 965	history2 18 0 64 <1 836 1361 1061
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350	Current 0 63 <1 901 1334 1025 1216	history1 17 0 57 0 840 1043 965 1148	history2 18 0 64 <1 836 1361 1061 1334
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350 4250	current           0           63           <1           901           1334           1025           1216           3665	history1 17 0 57 0 840 1043 965 1148 3657	history2           18           0           64           <1           836           1361           1061           1334           4275
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm ppm	method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350 4250 limit/base	current           0           0           63           <1           901           1334           1025           1216           3665           current	history1 17 0 57 0 840 1043 965 1148 3657 history1	history2           18           0           64           <1           836           1361           1061           1334           4275           history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm	method           ASTM D5185m	limit/base 250 10 100 450 450 3000 1150 1350 4250 kimit/base >25	current           0           63           <1           901           1334           1025           1216           3665           current           18	history1         17         0         57         0         840         1043         965         1148         3657         history1         4	history2           18           0           64           <1           836           1361           1061           1334           4275           history2           7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm 1 ppm 2 ppm 2 ppm 2 ppm 2 ppm 2 ppm 3 ppm 4 ppm 4 ppm 4 ppm 4	method           ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350 4250 kimit/base >25 >158	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3	history1         17         0         57         0         840         1043         965         1148         3657         history1         4         2	history2           18           0           64           <1           836           1361           1061           1334           4275           history2           7           3
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm 1 ppm 2 ppm 2 ppm 2 ppm 2 ppm 2 ppm 2 ppm 3 ppm 4 ppm 4 ppm 2 ppm 2 ppm 4	method           ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350 4250 25 >25 >158 >20	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3           0	history1           17           0           57           0           840           1043           965           1148           3657           history1           4           2           2	history2         18         0         64         <1         836         1361         1061         1334         4275         history2         7         3         3
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm 1 ppm 2 ppm 2	method           ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350 4250 kimit/base >25 >158 >20	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3           0           current	history1         17         0         57         0         840         1043         965         1148         3657         history1         4         2         2         history1	history2         18         0         64         <1         836         1361         1061         1334         4275         history2         7         3         3         history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm 1 ppm 2 ppm 2 ppm 2 ppm 2 ppm 2 ppm 3 ppm 4 ppm 4 ppm 2 ppm 2 ppm 4 ppm 4	method           ASTM D5185m	limit/base 250 10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20 <b>limit/base</b>	current         0         0         63         <1         901         1334         1025         1216         3665         current         18         3         0         current         1.5	history1         17         0         57         0         840         1043         965         1148         3657         history1         4         2         history1         0.4	history2           18           0           64           <1           836           1361           1061           1334           4275           history2           7           3           3           history2           0.7
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m	limit/base 250 10 450 3000 1150 1350 4250 255 >158 >20 limit/base >3 >20	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3           0           current           1.5           8.6	history1           17           0           57           0           840           1043           965           1148           3657           history1           4           2           history1           0.4           4.8	history2         18         0         64         <1         836         1361         1061         1334         4275         history2         7         3         3         history2         0.7         6.3
ADDITIVES 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	method           ASTM D5185m	limit/base 250 10 40 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20 <b>limit/base</b> >3 >20 >30	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3           0           current           1.5           8.6           20.6	history1         17         0         57         0         840         1043         965         1148         3657         history1         4         2         history1         0.4         4.8         17.3	history2         18         0         64         <1         836         1361         1061         1334         4275         history2         7         3         history2         0.7         6.3         18.6
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ррт ррт ррт ррт ррт ррт ррт ррт	method           ASTM D5185m           ASTM D5185m	limit/base 250 10 40 450 3000 1150 1350 4250 <b>limit/base</b> >25 >158 >20 <b>limit/base</b> >3 >20 >30	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3           0           current           1.5           8.6           20.6           current	history1         17         0         57         0         840         1043         965         1148         3657         history1         4         2         history1         0.4         4.8         17.3	history2         18         0         64         <1         836         1361         1061         1334         4275         history2         7         3         0.7         6.3         18.6
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRADA Oxidation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	method           ASTM D5185m           ASTM D7844           *ASTM D7844           *ASTM D7415           method           *ASTM D7414	limit/base 250 10 450 3000 1150 1350 4250 limit/base >25 >158 >20 limit/base >3 >20 30 limit/base >3 >20	current           0           0           63           <1           901           1334           1025           1216           3665           current           18           3           0           current           1.5           8.6           20.6           current           14.3	history1         17         0         57         0         840         1043         965         1148         3657         history1         4         2         history1         0.4         4.8         17.3         history1         12.0	history2         18         0         64         <1         836         1361         1061         1334         4275         history2         7         3         history2         0.7         6.3         18.6         history2         12.7



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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	scalar	*Visual	NONE	NONE	NONE	NONE	
The Ballon Ballon Brandston	Debris	scalar	*Visual	NONE	NONE	NONE	NONE	
	Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE	
lct19/2 /lay4/2	Appearance	scalar	*Visual	NORML	NORML	NORML	NORML	
0 2	Odor Emulaified Water	scalar	*Visual	NORML	NORML	NORIVIL	NORIVIL	
	Enuisilieu water	scalar	*Visual	>0.2	NEG	NEG	NEG	
		304141	VISUAI		NEG	NEG	NEG	
		IES			current	nistory I	nistory2	
		cSt	ASTM D445	14.4	14.3	14.3	14.4	
	GRAPHS				Lead (ppm)			
	<sup>250</sup> T			10				
9/23	200 - Severe			8	0 - Severe			
0ct1	<u>в</u> 150-			6 8	0			
	100 Abnormal			a 4	0 - Abnormal			
	50			2	0			
	3/20	8/22 -	.4/23 <b>-</b> 9/23 <b>-</b>	4/24	3/20	8/22	.4/23 - 9/23 -	
	Feb1 Mar1	Apr	May2 Oct1	May	Feb1 Mar1	Jull Apr	May2 Oct1 May	
	Aluminum (ppm)				ٍ Chromium (	opm)		
	50 Severe	1 1	1 1	5i	Severe			
	30	]].						
9/23	Abnormal			d 2	Abnormal			
0ct1	10-			1	0-			
		3				3 5		
	eb 13/2 lar 10/2 //ay 7/2	Apr8/2	ay24/2 )ct19/2	/lay4/2	eb 13/2 lar1 0/2	Jul18/2 Apr8/2	ay24/2 )ct19/2 /lay4/2	
	r s ≥ ¬ ¬ ¬ Copper (ppm)		Ψ O	2	Silicon (ppm)			
	400 Severend	1 1	1 1	8	<sup>0</sup> Severe			
	300			6	0-			
	<u></u> 200 -			E.4	0-			
	100-			2	Abnormal			
	0						$\sim$	
	13/20 10/20	18/22 - r8/23 -	24/23 .	y4/24 -	13/20	18/22 -	24/23 - 19/23 -	
	Feb Mari	Ap	May. Oct1	Ma	Mari	Jull	Mayi Octi May	
	Viscosity @ 100°C			Base Numbe	r			
	Abnormal			(B/HO	Abnormal			
	Base			9 B10	Base			
	Abnormal			nm per	Abnormal			
	12			Sase N				
		23	23 +	.0	20+0	22	23 +	
	Feb13, Mar10, May7/	Apr8/	May24, 0ct19/	May4,	Feb13, Mar10/	Jul18, Apr8/	May24, 0ct19/	
	-		-		_			
Laboratory	: WearCheck USA - 50	1 Madisc	n Ave., Cary	, NC 27513	IN	TERSTATE W	ASTE-NEWARK	
Sample No.	: WC0912331		110 EVERGRE	EEN AVE, BAY 3				
Lab Number	: 061/8340 · 11029666	Teste	0 :14 Nosed :14	i May 2024 May 2024 - M	Ves Davis		NEWARK, NJ	
Test Package	: MOB 1 ( Additional Te	ests: TBN	)	way 2024 - V	103 04113	Contact	: Robert Witynski	
sample report.	contact Customer Servi	ice at 1-8	00-237-136	9.	1	RWitynski@inte	erstatewaste.com	

To discuss this sample report, contact Customer Service at 1-800-237-1369.

\* - 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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Certificate L2367

Contact/Location: Robert Witynski - INT110NEW

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