

#### Machine Id **1535** Component **Diesel Engine** Fluid **DIESEL ENGINE OIL SAE 15W40 (--- QTS)**

# RECOMMENDATION

We advise that you check the fuel injection system. We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition. Please specify the component make and model with your next sample.

### WEAR

All component wear rates are normal.

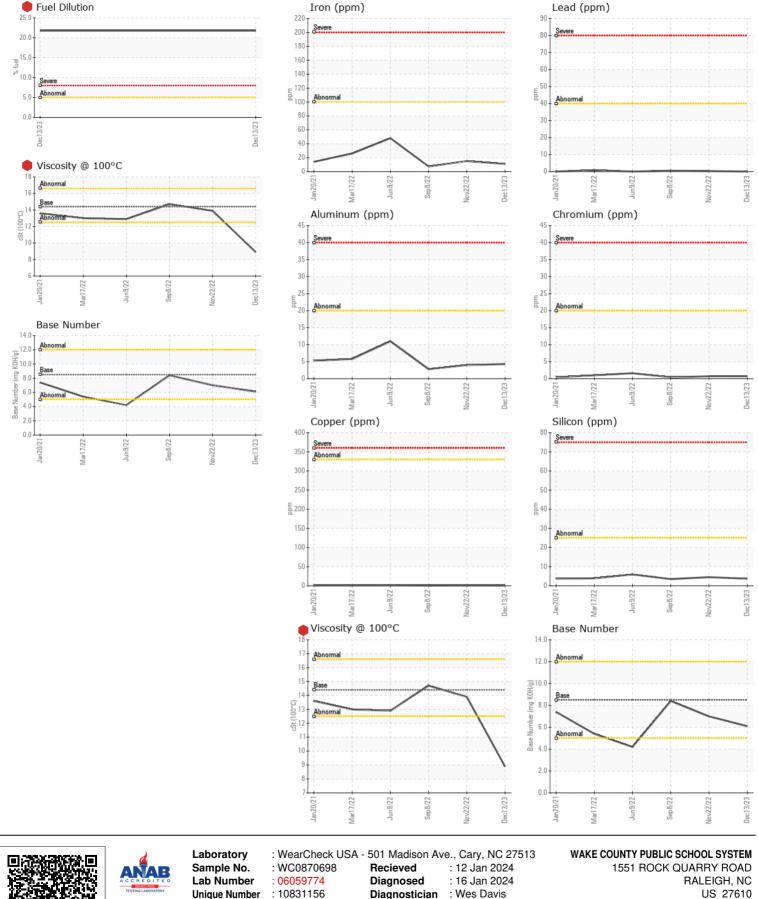
# CONTAMINATION

There is a high amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

### **FLUID CONDITION**

The BN result indicates that there is suitable alkalinity remaining in the oil. Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

Sample Number         Client Info         WC0870698         WC0761306         WC02797           Sample Date         Client Info         13 Dec 2023         22 Nov 2022         08 Sep 20           Machine Age         mls         Client Info         189201         169104         164861           Oil Age         mls         Client Info         0         0         0           Oil Changed         Client Info         Not Changd         Not Changd         Not Changd         Not Changd           Filter Changed         Client Info         Not Changd         Not Changd         Not Changd         Not Changd           Sample Status         SEVERE         NORMAL         NORMAL         NORMAL           Iron         ppm         ASTM D5185m         >100         11         15         7           Chromium         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >20         4         4         4         1           Vanadium         ppm         ASTM D5185m         >21         <1         <1         1					$\frown$		
Sample Date         Client Info         13 Dec 2023         22 Nov 2022         08 Sep 20           Machine Age         mis         Client Info         0         0         0         0           Oil Age         mis         Client Info         0         0         0         0           Filter Age         mis         Client Info         Not Changd         Not Changd         Not Changd         Not Changd           Filter Changed         Client Info         Not Changd         Not Changd         Not Changd         Not Changd           Sample Status         SEVERE         NORMAL         NORMAL         NORMAL         NORMAL           Nickel         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >3         0         0         <1           Aluminum         ppm         ASTM D5185m         >30         0         <1         <1           Copper         ppm         ASTM D5185m         >30         <1         <1         <1           Varadium         ppm         ASTM D5185m         >30         <1         <1         <1           Varadium         ppm         ASTM D5185m	Test	UOM	Method	Limit/Abn	Current	History1	History2
Machine Age         mls         Client Info         189201         169104         164861           Oil Age         mls         Client Info         0         0         0         0           Filter Age         mls         Client Info         Not Changd         Not Changd         Not Changd         Not Changd         Not Changd           Filter Changed         Client Info         Not Changd         Not Changd         Not Changd         Not Changd           Sample Status         SEVERE         NORMAL         NORMAL         NORMAL           Iron         ppm         ASTM D5185m         >100         11         15         7           Chromium         ppm         ASTM D5185m         >20         <1         <1         <1         1           Nickel         ppm         ASTM D5185m         >20         <1         <1         <1         <	Sample Number		Client Info		WC0870698	WC0761306	WC0729759
Oil Age         mls         Client Info         0         0         0         0           Filter Age         mls         Client Info         Not Changd         Not Changd         Not Changd           Filter Changed         Client Info         Not Changd         Not Changd         Not Changd           Sample Status         SEVERE         NORMAL         NORMAL         NORMAL           Iron         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >20         4         <1         <1         <1           Aluminum         ppm         ASTM D5185m         >20         4         <4         3         Lead         ppm         ASTM D5185m         >30         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <	Sample Date		Client Info		13 Dec 2023	22 Nov 2022	08 Sep 2022
Filter Age Oil ChangedmisClient InfoNot Changd Not Changd Norkal All all all all all all all all all all	Machine Age	mls	Client Info		189201	169104	164861
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Sample Status         SEVERE         NORMAL         NORMAL           Iron         ppm         ASTM D5185m         >100         11         15         7           Chromium         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >4         <1         <1         <1           Titanium         ppm         ASTM D5185m         >3         0         0         <11           Aluminum         ppm         ASTM D5185m         >30         0         <11         <11           Copper         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >20         4         4         4           Vanadium         ppm         ASTM D5185m         >15         <1         <1         1           Vanadium         ppm         ASTM D5185m         >20         3         3         0           Yellow Metal         scalar         *Visual         NONE         NONE         NONE         NONE <tr< th=""><th>Oil Changed</th><th></th><th>Client Info</th><th></th><th>Not Changd</th><th>Not Changd</th><th>Not Changd</th></tr<>	Oil Changed		Client Info		Not Changd	Not Changd	Not Changd
Iron         ppm         ASTM D5185m         >100         11         15         7           Chromium         ppm         ASTM D5185m         >20         <1         <1         <1           Nickel         ppm         ASTM D5185m         >4         <1         <1         <1           Titanium         ppm         ASTM D5185m         >3         0         0         <1           Aluminum         ppm         ASTM D5185m         >30         <1         <1         <1           Aluminum         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >20         4         4         3           Copper         ppm         ASTM D5185m         >20         3         0         0           White Metal         scalar         *Visual         NONE         NONE         NONE         NONE           Yellow Metal         scalar         *Visual         NONE         NONE         NONE         NONE           Silicon         ppm         ASTM D5185m<>20         3         3	Filter Changed		Client Info		Not Changd	Not Changd	Not Changd
Chromium         ppm         ASTM D5185m         >20         <1	Sample Status				SEVERE	NORMAL	NORMAL
Chromium         ppm         ASTM D5185m         >20         <1							
Nickel         ppm         ASTM D5185m         >4         <1	Iron	ppm	ASTM D5185m	>100	11	15	7
Titanium         ppm         ASTM D5185m         0         0         0         0           Silver         ppm         ASTM D5185m         >3         0         0         <1           Aluminum         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >30         <1         <1         <1           Copper         ppm         ASTM D5185m         >330         <1         <1         <1           Vanadium         ppm         ASTM D5185m         >30         <1         <1         1           Vanadium         ppm         ASTM D5185m         >15         <1         <1         1           Vanadium         ppm         ASTM D5185m         >15         <1         <1         1           Vanadium         ppm         ASTM D5185m         >25         4         4         4           Potassium         ppm         ASTM D5185m         >20         3         3         0           Fuel         %         ASTM D5185m         >20         3         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NE		ppm	ASTM D5185m	>20		<1	<1
Silver         ppm         ASTM D5185m         >3         0         0         <1	Nickel	ppm	ASTM D5185m	>4	<1	<1	<1
Aluminum         ppm         ASTM D5185m         >20         4         4         3           Lead         ppm         ASTM D5185m         >40         0         <1	Titanium	ppm	ASTM D5185m		0	0	0
Lead         ppm         ASTM D5185m         >40         0         <1		ppm			-		
Copper         ppm         ASTM D5185m         >330         <1	Aluminum	ppm	ASTM D5185m		4	4	
TinppmASTM D5185m>15<1		ppm			-	<1	
VanadiumppmASTM D5185m000White Metalscalar*VisualNONENONENONENONEYellow Metalscalar*VisualNONENONENONENONESiliconppmASTM D5185m>25444PotassiumppmASTM D5185m>20330Fuel%ASTM D3524>521.8<1.0<1.0WaterWC Method>0.2NEGNEGNEGGlycolWC Method>0.2NEGNEGNEGSoot %%*ASTM D7844>30.50.70.2NitrationAbs/cm*ASTM D7624>2010.110.48.2SulfationAbs/imm*ASTM D7624>3018.819.919.0Siltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLAppearancescalar*VisualNORMLNORMLNORMLNORMLModorscalar*VisualNORMLNORMLNORMLNORMLAppearancescalar*VisualNORMLNORMLNORMLNORMLAppearancescalar*VisualNORMLNORMLNORMLNORMLModorscalar*VisualNORMLNORMLNORMLNORMLAppearance<		ppm					
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Silicon         ppm         ASTM D5185m         >25         4         4         4           Potassium         ppm         ASTM D5185m         >20         3         3         0           Fuel         %         ASTM D3524         >5         21.8         <1.0		scalar		NONE	NONE	NONE	NONE
Potassium         ppm         ASTM D5185m         >20         3         3         0           Fuel         %         ASTM D3524         >5         \$21.8         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         >0.2         NEG         NEG         NEG           Soot %         %         *ASTM D7844         >3         0.5         0.7         0.2           Nitration         Abs/.mm         *ASTM D7624         >20         10.1         10.4         8.2           Sulfation         Abs/.imm         *ASTM D7415         >30         18.8         19.9         19.0           Silt         scalar         *Visual         NONE         NONE         NONE         NONE           Debris         scalar         *Visual         NONE         NONE         NONE         NONE           Appearance         scalar         *Visual         NORML         NORML         NORML         NORM           Odor         scalar         *Visual         NORM         NORML         NORM         NORM           Mored         scalar         *Visual         >0.2 <td< th=""><th>Yellow Metal</th><th>scalar</th><th>*Visual</th><th>NONE</th><th>NONE</th><th>NONE</th><th>NONE</th></td<>	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Potassium         ppm         ASTM D5185m         >20         3         3         0           Fuel         %         ASTM D3524         >5         \$21.8         <1.0         <1.0           Water         WC Method         >0.2         NEG         NEG         NEG           Glycol         WC Method         >0.2         NEG         NEG         NEG           Soot %         %         *ASTM D7844         >3         0.5         0.7         0.2           Nitration         Abs/.mm         *ASTM D7624         >20         10.1         10.4         8.2           Sulfation         Abs/.imm         *ASTM D7415         >30         18.8         19.9         19.0           Silt         scalar         *Visual         NONE         NONE         NONE         NONE           Debris         scalar         *Visual         NONE         NONE         NONE         NONE           Appearance         scalar         *Visual         NORML         NORML         NORML         NORM           Odor         scalar         *Visual         NORM         NORML         NORM         NORM           Mored         scalar         *Visual         >0.2 <td< th=""><th>Cillinea</th><th></th><th></th><th>05</th><th>4</th><th>4</th><th>4</th></td<>	Cillinea			05	4	4	4
Fuel         %         ASTM D3524         >5         21.8         <1.0					-		
Water         WC Method         >0.2         NEG         NEG         NEG         NEG           Glycol         WC Method         NEG         NEG         NEG         NEG         NEG           Soot %         %         *ASTM D7844         >3         0.5         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.1         10.4         8.2           Sulfation         Abs/.tmm         *ASTM D7624         >20         10.8         19.9         19.0           Silt         scalar         *Visual         NONE         NONE         NONE         NONE           Debris         scalar         *Visual         NONE         NONE         NONE         NONE           Sand/Dirt         scalar         *Visual         NOR         NORML         NORM         NORM           Appearance         scalar         *Visual         NORML         NORML         NORM         NORM           Gor         scalar         *Visual         NORM         NORML         NORM         NORM           More         scalar         *Visual         >0.2         NEG         NEG         NEG           Sodium         ppm         A						_	
Glycol         WC Method         NEG         NEG         NEG           Soot %         %         *ASTM D7844         >3         0.5         0.7         0.2           Nitration         Abs/cm         *ASTM D7844         >3         0.5         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.1         10.4         8.2           Sulfation         Abs/.tmm         *ASTM D7415         >30         18.8         19.9         19.0           Silt         scalar         *Visual         NONE         NONE         NONE         NONE           Debris         scalar         *Visual         NONE         NONE         NONE         NONE           Sand/Dirt         scalar         *Visual         NOR         NORE         NONE         NORE           Appearance         scalar         *Visual         NORM         NORML         NORM         NORM           Odor         scalar         *Visual         NORM         NORML         NORM         NORM           Emulsified Water         scalar         *Visual         >0.2         NEG         NEG         NEG           Sodium         ppm         ASTM D5185m		%			•		
Soot %         %         *ASTM D7844         >3         0.5         0.7         0.2           Nitration         Abs/cm         *ASTM D7624         >20         10.1         10.4         8.2           Sulfation         Abs/.tmm         *ASTM D7624         >20         10.1         10.4         8.2           Sulfation         Abs/.tmm         *ASTM D7624         >30         18.8         19.9         19.0           Silt         scalar         *Visual         NONE         NONE         NONE         NONE           Debris         scalar         *Visual         NONE         NONE         NONE         NONE           Sand/Dirt         scalar         *Visual         NOR         NORE         NONE         NONE           Appearance         scalar         *Visual         NORM         NORML         NORM         NORM           Odor         scalar         *Visual         NORM         NORML         NORM         NORM           Emulsified Water         scalar         *Visual         >0.2         NEG         NEG         NEG           Sodium         ppm         ASTM D5185m         >158         2         2         1           Boron         ppm				>0.2			
NitrationAbs/cm*ASTM D7624>2010.110.48.2SulfationAbs/.1mm*ASTM D7415>3018.819.919.0Siltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLCorscalar*VisualNORMLNORMLNORMLNORMLBoronppmASTM D5185m250232215BariumppmASTM D5185m100636561ManganeseppmASTM D5185m0<1<<1	-	0/		0			
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Sand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGNEGSodiumppmASTM D5185m>158221BoronppmASTM D5185m250232255BariumppmASTM D5185m10300MolybdenumppmASTM D5185m100636561ManganeseppmASTM D5185mT0<1<1				-	-	-	
Appearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGNEGSodiumppmASTM D5185m>158221BoronppmASTM D5185m250232255BariumppmASTM D5185m10300MolybdenumppmASTM D5185m100636561ManganeseppmASTM D5185m0<1<1				-	-		
Odorscalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGNEGNEGSodiumppmASTM D5185m>158221BoronppmASTM D5185m250232255BariumppmASTM D5185m10300MolybdenumppmASTM D5185m100636561ManganeseppmASTM D5185m0<1<1				-			
Emulsified Water         scalar         *Visual         >0.2         NEG         NEG         NEG           Sodium         ppm         ASTM D5185m         >158         2         2         1           Boron         ppm         ASTM D5185m         250         23         22         55           Barium         ppm         ASTM D5185m         10         3         0         0           Molybdenum         ppm         ASTM D5185m         100         63         65         61           Manganese         ppm         ASTM D5185m         0         <1         <1					-	_	
Sodium         ppm         ASTM D5185m         >158         2         2         1           Boron         ppm         ASTM D5185m         250         23         22         55           Barium         ppm         ASTM D5185m         10         3         0         0           Molybdenum         ppm         ASTM D5185m         100         63         65         61           Manganese         ppm         ASTM D5185m         0         <1				-	-	-	
Boron         ppm         ASTM D5185m         250         23         22         55           Barium         ppm         ASTM D5185m         10         3         0         0           Molybdenum         ppm         ASTM D5185m         100         63         65         61           Manganese         ppm         ASTM D5185m         0         <1		SCalar	visual	>0.2	NEG	NEG	NEG
Boron         ppm         ASTM D5185m         250         23         22         55           Barium         ppm         ASTM D5185m         10         3         0         0           Molybdenum         ppm         ASTM D5185m         100         63         65         61           Manganese         ppm         ASTM D5185m         0         <1	Sodium	ppm	ASTM D5185m	>158	2	2	1
Barium         ppm         ASTM D5185m         10         3         0         0           Molybdenum         ppm         ASTM D5185m         100         63         65         61           Manganese         ppm         ASTM D5185m         0         <1	Boron		ASTM D5185m	250	23		55
Molybdenum         ppm         ASTM D5185m         100         63         65         61           Manganese         ppm         ASTM D5185m         0         <1							
Manganese         ppm         ASTM D5185m         0         <1							
Magnesium ppm Astribution 450 09 04 50	Magnesium	ppm	ASTM D5185m	450	89	64	58
Calcium ppm ASTM D5185m 3000 1463 2003 1845	Calcium		ASTM D5185m		1463		
Phosphorus ppm ASTM D5185m 1150 789 922 883	Phosphorus		ASTM D5185m	1150	789	922	883
Zinc ppm ASTM D5185m 1350 901 1141 1069			ASTM D5185m				1069
Sulfur ppm ASTM D5185m 4250 2779 3670 3205							
Oxidation Abs/.1mm *ASTM D7414 >25 16.3 15.3 13.7							13.7
Base Number (BN) mg KOH/g ASTM D2896 8.5 6.1 7.0 8.4			ASTM D2896			7.0	
Visc @ 100°C cSt ASTM D445 14.4 ( 8.9 13.9 14.7	Visc @ 100°C		ASTM D445		8.9		14.7



 Certificate L2367
 Test Package
 : MOB 1 (Additional Tests: FuelDilution, PercentFuel, TBN)

 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)

1551 ROCK QUARRY ROAD RALEIGH, NC US 27610 Contact: DEVIN WEBER dweber@wcpss.net T: (919)856-8076 ) F: x:

Contact/Location: DEVIN WEBER - WCPRAL