

Machine Id **1421** Component **Diesel Engine** Fluid **DIESEL ENGINE OIL SAE 15W40 (--- QTS)**

RECOMMENDATION

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.

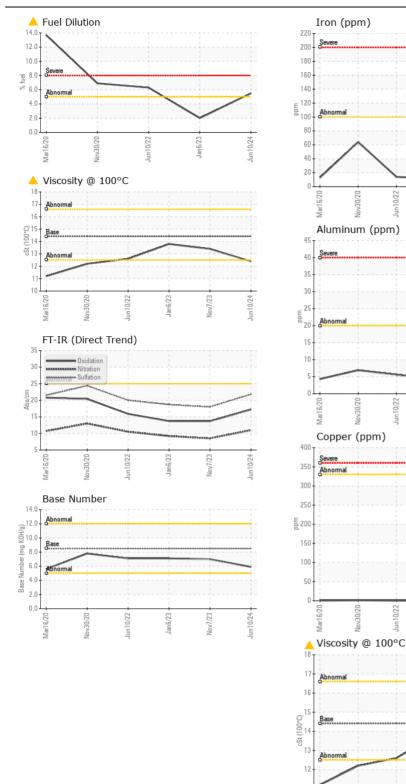
CONTAMINATION

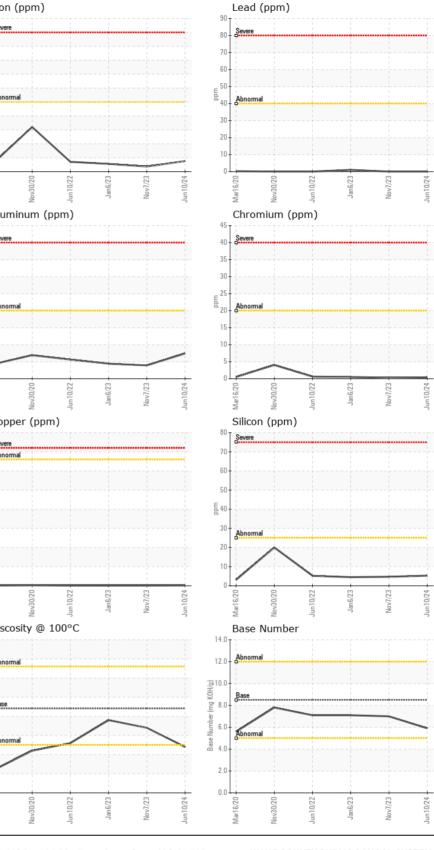
There is a moderate amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

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 Date Client Info 10 Jun 2024 07 Nov 2023 06 Jan 2023 Machine Age mis Client Info 0 0 0 0 Oil Age mis Client Info 0 0 0 0 Filter Age mis Client Info N/A Not Change Not Change Filter Changed Client Info N/A Not Change Not Change Sample Status Client Info N/A Not Change Not Change Iron ppm ASTM D5185m<>100 15 7 11 Chromium ppm ASTM D5185m<>20 <1 <1 <1 Nickel ppm ASTM D5185m<>20 <7 4 4 Lead ppm ASTM D5185m<>20 7 4							
Sample Date Client Info 10 Jun 2024 07 Nov 2023 06 Jan 2023 Machine Age mis Client Info 0 0 0 0 Oil Age mis Client Info 0 0 0 0 Filter Age mis Client Info N/A Not Change Not Change Filter Changed Client Info N/A Not Change Not Change Sample Status Client Info N/A Not Change Not Change Sample Status Samople Status Samople Status Nor Nor Nor Iron ppm ASTM D5165m >20 <1 <1 <1 Chomium ppm ASTM D5165m >20 <7 4 4 Lead ppm ASTM D5165m >20 7 4 4 Lead ppm ASTM D5165m >20 1 <1 <1 Tin ppm ASTM D5165m >20 1 <1 <1	Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Date Client Info 10 Jun 2024 07 Nov 2023 06 Jan 2023 Machine Age mis Client Info 0 0 0 0 Oil Age mis Client Info 0 0 0 0 Filter Age mis Client Info N/A Not Change Not Change Filter Changed Client Info N/A Not Change Not Change Sample Status Client Info N/A Not Change Not Change Sample Status Samople Status Samople Status Nor Nor Nor Iron ppm ASTM D5165m >20 <1 <1 <1 Chomium ppm ASTM D5165m >20 <7 4 4 Lead ppm ASTM D5165m >20 7 4 4 Lead ppm ASTM D5165m >20 1 <1 <1 Tin ppm ASTM D5165m >20 1 <1 <1	Sample Number		Client Info		WC0948974	WC0870825	WC0772863
Machine Age mls Client Info 251270 294330 214212 Oil Age mls Client Info 0 0 0 Filter Age mls Client Info N/A Not Changed Not Changed Oil Changed Client Info N/A Not Change Not Change Sample Status Client Info N/A Not Change Not Change Iron ppm ASTM D5185m >200 <1 <1 <1 Chromium ppm ASTM D5185m >200 <1 <1 <1 <1 Nickel ppm ASTM D5185m >200 <1 <1 <1 <1 Silver ppm ASTM D5185m >200 <1 <1 <1 <1 <1 Irin ppm ASTM D5185m >30 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 </th <th></th> <th></th> <th>Client Info</th> <th></th> <th>10 Jun 2024</th> <th>07 Nov 2023</th> <th>06 Jan 2023</th>			Client Info		10 Jun 2024	07 Nov 2023	06 Jan 2023
Filter Age mls Client Info NA Not Changed Not Changed Filter Changed Client Info N/A Not Changed Not Changed Sample Status ABNORMAL Nort Changed Not Changed Iron ppm ASTM D5185m<>100 15 7 11 Chromium ppm ASTM D5185m<>20 <1 <1 <1 Nickel ppm ASTM D5185m<>20 <1 <1 <1 Nickel ppm ASTM D5185m<>3 0 0 0 Silver ppm ASTM D5185m<>30 0 <1 1 Copper ppm ASTM D5185m<>30 1 <1 <1 Copper ppm ASTM D5185m<>30 1 <1 <1 Vanadium ppm ASTM D5185m<>15 0 0 <1 <1 Vanadium ppm ASTM D5185m<>25 5 5 4 <2 <1< <1 <1 <1 <1< <1 <1< <th></th> <th>mls</th> <th>Client Info</th> <th></th> <th>251270</th> <th>234330</th> <th>214212</th>		mls	Client Info		251270	234330	214212
Filter Age mls Client Info NA Not Changed Not Changed Filter Changed Client Info N/A Not Changed Not Changed Sample Status ABNORMAL Nort Changed Not Changed Iron ppm ASTM D5185m<>100 15 7 11 Chromium ppm ASTM D5185m<>20 <1 <1 <1 Nickel ppm ASTM D5185m<>20 <1 <1 <1 Nickel ppm ASTM D5185m<>3 0 0 0 Silver ppm ASTM D5185m<>30 0 <1 1 Copper ppm ASTM D5185m<>30 1 <1 <1 Copper ppm ASTM D5185m<>30 1 <1 <1 Vanadium ppm ASTM D5185m<>15 0 0 <1 <1 Vanadium ppm ASTM D5185m<>25 5 5 4 <2 <1< <1 <1 <1 <1< <1 <1< <th>Oil Age</th> <th>mls</th> <th>Client Info</th> <th></th> <th>0</th> <th>0</th> <th>0</th>	Oil Age	mls	Client Info		0	0	0
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Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >20 7 4 4 Lead ppm ASTM D5185m >20 7 4 4 Lead ppm ASTM D5185m >20 7 4 4 Copper ppm ASTM D5185m >20 0 0 1 Vanadium ppm ASTM D5185m >15 0 0 <1	Nickel	ppm	ASTM D5185m	>4	0	0	0
Aluminum ppm ASTM D5185m >20 7 4 4 Lead ppm ASTM D5185m >40 0 0 1 Copper ppm ASTM D5185m >330 1 <1 <1 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m >15 0 0 <1 White Metal scalar *Visual NONE NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE NONE Silicon ppm ASTM D5185m >20 4 3 1 Fuel % ASTM D5185m >20 4 3 1 Fuel % ASTM D5185m >20 4 3 1 Fuel % ASTM D5185m >20 11.0 8.5 9.2 Sulfation Abs/1mm YASTM D7624 >20	Titanium	ppm	ASTM D5185m		0	<1	0
Aluminum ppm ASTM D5185m >20 7 4 4 Lead ppm ASTM D5185m >40 0 0 1 Copper ppm ASTM D5185m >330 1 <1 <1 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m >15 0 0 <1 White Metal scalar *Visual NONE NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE NONE NONE Silicon ppm ASTM D5185m >20 4 3 1 Fuel % ASTM D5185m >20 4 3 1 Fuel % ASTM D5185m >20 4 3 1 Fuel % ASTM D7844 >3 0.9 0.3 0.4 Nitration Abs/cm< "ASTM D77415 >30 21.8 <th>Silver</th> <th></th> <th>ASTM D5185m</th> <th>>3</th> <th>0</th> <th>0</th> <th>0</th>	Silver		ASTM D5185m	>3	0	0	0
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Copper ppm ASTM D5185m >330 1 <1	Lead		ASTM D5185m	>40	0	0	1
Tin ppm ASTM D5185m >15 0 0 <1					-		
Vanadium ppm ASTM D5185m 0 0 <1					-		
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Potassium ppm ASTM D5185m >20 4 3 1 Fuel % ASTM D3524 >5 ▲ 5.5 <1.0 ▲ 2.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG Soot % % *ASTM D7844 >3 0.9 0.3 0.4 Nitration Abs/.m *ASTM D7624 >20 11.0 8.5 9.2 Sulfation Abs/.m *ASTM D7624 >20 11.0 8.5 9.2 Sulfation Abs/.im *ASTM D7624 >30 21.8 18.0 18.7 Silt scalar *Visual NONE NONE NONE NONE Debris scalar *Visual NOR NORML NORML NORML NORML Appearance scalar *Visual NOR NORML NORML NORML NORML Emulsified Water scalar <th></th> <th>Jouran</th> <th>Violal</th> <th>NONL</th> <th></th> <th></th> <th>NONL</th>		Jouran	Violal	NONL			NONL
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Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG Soot % % *ASTM D7844 >3 0.9 0.3 0.4 Nitration Abs/cm *ASTM D7624 >20 11.0 8.5 9.2 Sulfation Abs/cm *ASTM D7624 >20 11.0 8.5 9.2 Sulfation Abs/.tmm *ASTM D7615 >30 21.8 18.0 18.7 Silt scalar *Visual NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NORE Sand/Dirt scalar *Visual NORM NORML NORML NORML Odor scalar *Visual NORM NORML NORML NORML Odor scalar *Visual NOR NORML NORML NORML Emulsified Water scalar *Visual NO2 <	Potassium	ppm	ASTM D5185m	>20	4	3	1
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Soot % % *ASTM D7844 >3 0.9 0.3 0.4 Nitration Abs/cm *ASTM D7624 >20 11.0 8.5 9.2 Sulfation Abs/1mm *ASTM D7624 >20 21.8 18.0 18.7 Silt scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE NONE Sand/Dirt scalar *Visual NOR NORML	Water		WC Method	>0.2	NEG	NEG	NEG
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Sulfation Abs/.tmm *ASTM D7415 >30 21.8 18.0 18.7 Silt scalar *Visual NONE NONE NONE NONE NONE Debris scalar *Visual NONE NONE NONE NONE NONE Sand/Dirt scalar *Visual NONE NONE NONE NONE NONE Appearance scalar *Visual NORML NORM AGMU SAGMU NORM SAGM	-	%	*ASTM D7844	>3	0.9	0.3	0.4
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Sand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGNEGSodiumppmASTM D5185m>1582<14BoronppmASTM D5185m250204346BariumppmASTM D5185m10061MolybdenumppmASTM D5185m1008083376ManganeseppmASTM D5185m450106119433CalciumppmASTM D5185m3000202120392116PhosphorusppmASTM D5185m1350117411551238SulfurppmASTM D5185m4250386738354328OxidationAbs.1mm*ASTM D7144>2517.213.713.7Base Number (BN)mg KOHgASTM D28968.55.97.07.1	Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance scalar *Visual NORML	Sand/Dirt				NONE	NONE	
Odor scalar *Visual NORML <		scalar		NORML	NORML		
Emulsified Water scalar *Visual >0.2 NEG NEG NEG Sodium ppm ASTM D5185m >158 2 <1 4 Boron ppm ASTM D5185m 250 20 43 46 Barium ppm ASTM D5185m 10 0 6 1 Molybdenum ppm ASTM D5185m 100 80 83 76 Manganese ppm ASTM D5185m 100 80 119 43 Calcium ppm ASTM D5185m 450 106 119 43 Calcium ppm ASTM D5185m 3000 2021 2039 2116 Phosphorus ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs/.1mm<*ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D28					NORML		NORML
Sodium ppm ASTM D5185m >158 2 <1	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Boron ppm ASTM D5185m 250 20 43 46 Barium ppm ASTM D5185m 10 0 6 1 Molybdenum ppm ASTM D5185m 100 80 83 76 Manganese ppm ASTM D5185m 100 80 83 76 Magnesium ppm ASTM D5185m 100 80 83 76 Magnesium ppm ASTM D5185m 450 106 119 43 Calcium ppm ASTM D5185m 3000 2021 2039 2116 Phosphorus ppm ASTM D5185m 1150 977 981 995 Zinc ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs/.1mm<*ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							
Barium ppm ASTM D5185m 10 0 6 1 Molybdenum ppm ASTM D5185m 100 80 833 76 Manganese ppm ASTM D5185m 100 80 833 76 Magnesium ppm ASTM D5185m 100 80 833 76 Magnesium ppm ASTM D5185m 450 106 119 43 Calcium ppm ASTM D5185m 3000 2021 2039 2116 Phosphorus ppm ASTM D5185m 1150 977 981 995 Zinc ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs.1mm<*ASTM D7414<>25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1	Sodium	ppm	ASTM D5185m	>158	2	<1	4
Molybdenum ppm ASTM D5185m 100 80 83 76 Manganese ppm ASTM D5185m <	Boron	ppm	ASTM D5185m	250	20	43	46
Manganese ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m	10	0	6	1
Magnesium ppm ASTM D5185m 450 106 119 43 Calcium ppm ASTM D5185m 3000 2021 2039 2116 Phosphorus ppm ASTM D5185m 1150 977 981 995 Zinc ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs/.1mm *ASTM D2896 8.5 5.9 7.0 7.1	Molybdenum	ppm	ASTM D5185m	100	80	83	76
Calcium ppm ASTM D5185m 3000 2021 2039 2116 Phosphorus ppm ASTM D5185m 1150 977 981 995 Zinc ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs.1mm *ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1	Manganese	ppm	ASTM D5185m		<1	0	<1
Phosphorus ppm ASTM D5185m 1150 977 981 995 Zinc ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs.1mm *ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1	Magnesium	ppm	ASTM D5185m	450	106	119	43
Zinc ppm ASTM D5185m 1350 1174 1155 1238 Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs.1mm *ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOHg ASTM D2896 8.5 5.9 7.0 7.1	Calcium	ppm	ASTM D5185m	3000	2021	2039	2116
Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs/.1mm *ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1	Phosphorus	ppm	ASTM D5185m	1150	977	981	995
Sulfur ppm ASTM D5185m 4250 3867 3835 4328 Oxidation Abs/.1mm *ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1	Zinc	ppm	ASTM D5185m	1350	1174	1155	1238
Oxidation Abs/.1mm *ASTM D7414 >25 17.2 13.7 13.7 Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1	Sulfur		ASTM D5185m	4250	3867	3835	4328
Base Number (BN) mg KOH/g ASTM D2896 8.5 5.9 7.0 7.1		Abs/.1mm	*ASTM D7414			13.7	13.7
		mg KOH/g	ASTM D2896				
	. ,	cSt			12.4		





WAKE COUNTY PUBLIC SCHOOL SYSTEM Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No. : WC0948974 Received 1551 ROCK QUARRY ROAD : 26 Jun 2024 Lab Number : 06220899 RALEIGH, NC Tested : 01 Jul 2024 : 01 Jul 2024 - Wes Davis US 27610 Unique Number : 11099096 Diagnosed Test Package : MOB 1 (Additional Tests: FuelDilution, PercentFuel, TBN) Contact: DEVIN WEBER Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. dweber@wcpss.net * - Denotes test methods that are outside of the ISO 17025 scope of accreditation. T: (919)856-8076 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: x:

10

Mar16/20

Contact/Location: DEVIN WEBER - WCPRAL Page 2 of 2