

Machine Id **12376** Component **Diesel Engine** Filuid **DIESEL ENGINE OIL SAE 5W30 (--- QTS) RECOMMENDATION**

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

\mathbf{c}	NTAM	

All component wear rates are normal.

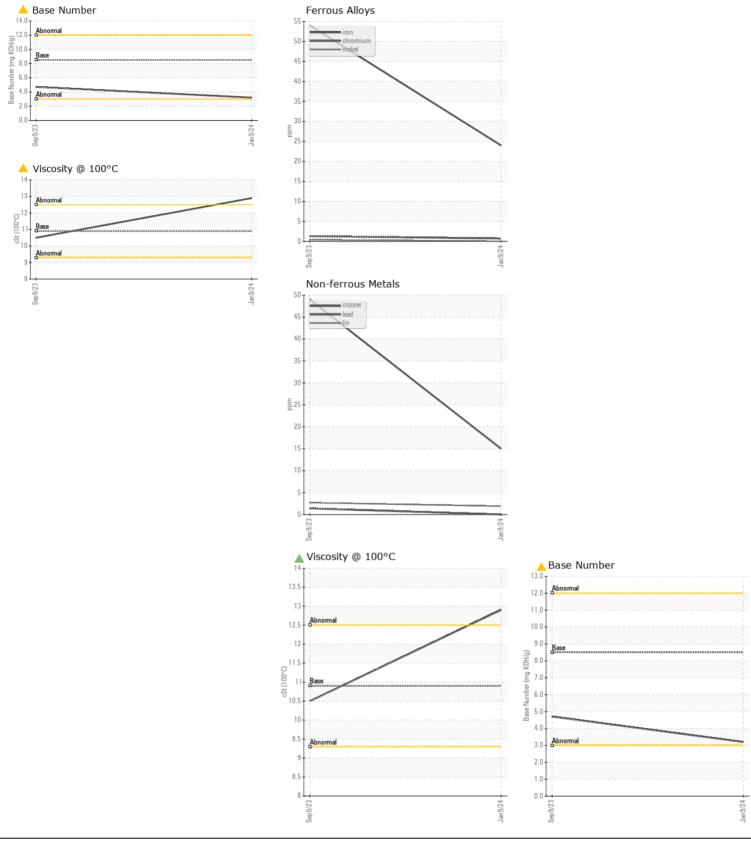
WEAR

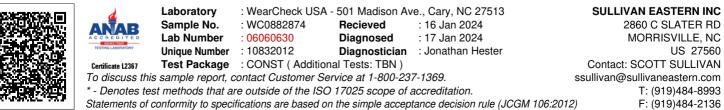
There is no indication of any contamination in the oil.

FLUID CONDITION

The oil viscosity is higher than normal. The BN level is low. Confirm oil type.

Test UOM Method Limit/An Current History1 History2 Sample Number Client Info 09 Jan 2024 09 Sep 2023 Sample Date Client Info 09 Jan 2024 09 Sep 2023 Oil Age mls Client Info 0 0 Oil Age mls Client Info 0 0 Oil Age mls Client Info Changed Changed Filter Changed Client Info Changed Changed Sample Status ABNORMAL ABNORMAL Iron ppm ASTM 05185m >40 Nickel ppm ASTM 05185m >20 Silver ppm ASTM 05185m >20 8 5 Lead ppm ASTM 05185m >20 8 5 Vanadium ppm ASTM 05185m >20 3 1							
Sample Number Client Info WC0828274 WC0846392 Machine Age mis Client Info 99 Jan 2024 09 Sep 2023 Machine Age mis Client Info 14934 7761 Oil Age mis Client Info 0 0 Filter Age mis Client Info Changed Changed Filter Changed Client Info Changed Changed Sample Status Client Info Changed Changed Iron ppm ASTMD5185m >20 <1 1 Nickel ppm ASTMD5185m >20 8 5 Silver ppm ASTMD5185m >20 8 5 Lead ppm ASTMD5185m >20 8 5 Vanadium ppm ASTMD5185m >20 3	Test	UOM	Method	Limit/Abn	Current	History1	History2
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Oil Age mls Client Info 0 0 Filter Age mls Client Info Changed Changed Gil Changed Client Info Changed Changed Sample Status Client Info ABNORMAL ABNORMAL Iron ppm ASTM D5185m >200 <1 1 Nickel ppm ASTM D5185m >200 <1 1 Silver ppm ASTM D5185m >30 0 0 Aluminum ppm ASTM D5185m >30 0 1 Vanadium ppm ASTM D5185m >30 15 49 Vanadium ppm ASTM D5185m >30 15 49 Vanadium ppm ASTM D5185m >20 3 11 Valew visual NONE NONE NONE NONE	Sample Date		Client Info		09 Jan 2024	09 Sep 2023	
Filter Age mls Client Info 0 0	Machine Age	mls	Client Info		14934	7761	
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Filter Changed Sample Status Client Info Changed ABNORMAL Changed ABNORMAL	Filter Age	mls	Client Info		0	0	
Filter Changed Sample Status Client Info Changed ABNORMAL Changed ABNORMAL	Oil Changed		Client Info		Changed	Changed	
Iron ppm ASTM D5185m >100 24 54 Chromium ppm ASTM D5185m >20 <1 1 Nickel ppm ASTM D5185m >20 <1 1 Silver ppm ASTM D5185m >3 0 0 Aluminum ppm ASTM D5185m >20 8 5 Lead ppm ASTM D5185m >40 0 1 Copper ppm ASTM D5185m >40 0 1 Vanadium ppm ASTM D5185m >40 0 1 Vanadium ppm ASTM D5185m >12 3 Vellow Metal scalar "Visual NONE NONE NONE Silicon ppm ASTM D5185m >20 3 11 Fuel WC Method >0 -2	Filter Changed		Client Info		-	Changed	
Iron ppm ASTM D5185m >100 24 54 Chromium ppm ASTM D5185m >20 <1 1 Nickel ppm ASTM D5185m >4 0 <1 Titanium ppm ASTM D5185m >3 0 0 Silver ppm ASTM D5185m >20 8 5 Lead ppm ASTM D5185m >20 8 5 Copper ppm ASTM D5185m >15 2 3 Vanadium ppm ASTM D5185m >15 2 3 Vanadium ppm ASTM D5185m >25 32 79 Vellow Metal scalar *Visual NONE NONE NONE Silicon ppm ASTM D5185m >20 3 11 Fuel WC Method >0.2 NEG	Sample Status				ABNORMAL	ABNORMAL	
Chromium ppm ASTM D5185m >20 <1	· · · · · · · · · · · · · · · · · · ·						
Nickel ppm ASTM D5185m > 4 0 < 1	Iron	ppm	ASTM D5185m	>100	24	54	
Titanium ppm ASTM D5185m <1	Chromium	ppm	ASTM D5185m	>20	<1	1	
Silver ppm ASTM D5185m >3 0 0 Aluminum ppm ASTM D5185m >20 8 5 Lead ppm ASTM D5185m >40 0 1 Copper ppm ASTM D5185m >15 2 3 Vanadium ppm ASTM D5185m <1 <1 White Metal scalar *Visual NONE NONE NONE Silicon ppm ASTM D5185m >20 3 11 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0 <1.0 Soot % % *ASTM D7624 >20 14.3 12.6 Solfation Abs/tmm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/tmm *ASTM D7624 >20 14.3 12.6	Nickel	ppm	ASTM D5185m	>4	0	<1	
Aluminum ppm ASTM D5185m >20 8 5 Lead ppm ASTM D5185m >40 0 1 Copper ppm ASTM D5185m >330 15 49 Tin ppm ASTM D5185m >15 2 3 Vanadium ppm ASTM D5185m <1 <1 White Metal scalar *Visual NONE NONE NONE Silicon ppm ASTM D5185m >25 32 ▲ 79 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0.2 NEG NEG Soot % % 'ASTM D7844 >3 0 0 Sulfation Abs/rm< 'ASTM D7415 >30 27.0 22.4 Soot % % 'ASTM D7815 >30 27.0 <td< th=""><th>Titanium</th><th>ppm</th><th>ASTM D5185m</th><th></th><th><1</th><th><1</th><th></th></td<>	Titanium	ppm	ASTM D5185m		<1	<1	
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Copper ppm ASTM D5185m >330 15 49 Tin ppm ASTM D5185m >15 2 3 Vanadium ppm ASTM D5185m <1 <1 White Metal scalar *Visual NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE Silicon ppm ASTM D5185m >20 3 11 Potassium ppm ASTM D5185m >20 3 11 Fuel WC Method >0 <1.0 < Water WC Method >0.2 NEG NEG Sulfation Abs/cm< *ASTM D7844<>3 0 0 Sulfation Abs/lmm<*ASTM D7815 30 27.0 22.4 Sand/Dirt scalar *Visual NONE NONE NONE	Aluminum	ppm	ASTM D5185m	>20	8	5	
Tin ppm ASTM D5185m >15 2 3 Vanadium ppm ASTM D5185m <1 <1 White Metal scalar *Visual NONE NONE NONE Yellow Metal scalar *Visual NONE NONE NONE Silicon ppm ASTM D5185m >20 3 11 Potassium ppm ASTM D5185m >20 3 11 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0 0 Soot % % *ASTM D7624 >20 14.3 12.6 Sulfation Abs/.tmm< *ASTM D715 >30 27.0 22.4 Sulfation Abs/.tmm *ASTM D715 >30 27.0 22.4 Sadd/Dirt scalar *Visual NONE NONE NONE <th>Lead</th> <th>ppm</th> <th>ASTM D5185m</th> <th>>40</th> <th>0</th> <th>1</th> <th></th>	Lead	ppm	ASTM D5185m	>40	0	1	
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Vanadium ppm ASTM D5185m <1		ppm	ASTM D5185m	>15	2	3	
Yellow Metal scalar *Visual NONE NONE Silicon ppm ASTM D5185m<>25 32 ▲ 79 Potassium ppm ASTM D5185m<>20 3 11 Fuel WC Method<>5 <1.0 <1.0 Water WC Method<>0.2 NEG NEG Glycol WC Method >0 0 Soot % % *ASTM D7844<>3 0 0 Nitration Abs/.mm<*ASTM D7624<>20 14.3 12.6 Sulfation Abs/.imm<*ASTM D7624<>20 14.3 12.6 Sulfation Abs/.imm<*ASTM D7624<>20 14.3 12.6 Sulfation Abs/.imm<*ASTM D7624<>0 PNONE NONE Sand/Dirt scalar *Visual NONE NORE Appearance scalar *Visual NORM NORML NORML	Vanadium	ppm	ASTM D5185m		<1	<1	
Silicon ppm ASTM D5185m< >25 32 79 Potassium ppm ASTM D5185m >20 3 11 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0 NEG NEG Glycol WC Method >0.2 NEG NEG Soot % % *ASTM D7844 >3 0 0 Nitration Abs/cm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/lmm *ASTM D7152 >30 27.0 22.4 Sadd/Dirt scalar *Visual NORE	White Metal	scalar	*Visual	NONE	NONE	NONE	
Silicon ppm ASTM D5185m< >25 32 79 Potassium ppm ASTM D5185m >20 3 11 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0 NEG NEG Glycol WC Method >0.2 NEG NEG Soot % % *ASTM D7844 >3 0 0 Nitration Abs/cm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/lmm *ASTM D7152 >30 27.0 22.4 Sadd/Dirt scalar *Visual NORE	Yellow Metal	scalar	*Visual	NONE	NONE	NONE	
Potassium ppm ASTM D5185m >20 3 11 Fuel WC Method >5 <1.0 <1.0 Water WC Method >0.2 NEG NEG Glycol WC Method >0.2 NEG NEG Soot % % *ASTM D7844 >3 0 0 Nitration Abs/cm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/cm *ASTM D7614 >30 27.0 22.4 Sulfation scalar *Visual NONE NONE NONE Appearance scalar *Visual NORML							
Fuel WC Method >5 <1.0	Silicon	ppm	ASTM D5185m	>25	32	1 79	
Water WC Method >0.2 NEG NEG Glycol WC Method NEG NEG Soot % % *ASTM D7844 >3 0 0 Nitration Abs/cm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/cm *ASTM D7615 >30 27.0 22.4 Silt scalar *Visual NONE NONE NONE Debris scalar *Visual NONE NONE NONE Appearance scalar *Visual NORM NORML NORML Odor scalar *Visual NORM NORML Mappearance scalar *Visual NORM NORML Odor scalar *Visual NORM NORML Boron ppm ASTM D5185m 10 0	Potassium	ppm	ASTM D5185m	>20	3	11	
Glycol WC Method NEG NEG Soot % % *ASTM D7844 >3 0 0 Nitration Abs/.tmm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/.tmm *ASTM D7615 >30 27.0 22.4 Sulfation Scalar *Visual NONE NONE NONE Appearance scalar *Visual NORML NORML NORML Odor scalar *Visual >0.2 NEG NEG Sodium ppm ASTM D5185m 10 0 0 Sodium ppm	Fuel		WC Method	>5	<1.0	<1.0	
Soot % % *ASTM D7844 >3 0 0 Nitration Abs/cm *ASTM D7624 >20 14.3 12.6 Sulfation Abs/.1mm *ASTM D7415 >30 27.0 22.4 Silt scalar *Visual NONE NONE NONE Debris scalar *Visual NONE NONE NONE Sand/Dirt scalar *Visual NONE NONE NONE Appearance scalar *Visual NORML NORML NORML Odor scalar *Visual NORML NORML NORML Odor scalar *Visual NORML NORML NORML Odor scalar *Visual NORML NORML NORML Emulsified Water scalar *Visual >0.2 NEG NEG Boron	Water		WC Method	>0.2	NEG	NEG	
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SulfationAbs/.1mm*ASTM D7415>3027.022.4Siltscalar*VisualNONENONENONEDebrisscalar*VisualNONENONENONESand/Dirtscalar*VisualNONENONENONEAppearancescalar*VisualNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGSodiumppmASTM D5185m2502117BariumppmASTM D5185m10000ManganeseppmASTM D5185m100301777MagnesiumppmASTM D5185m450682512PhosphorusppmASTM D5185m1150706694ZincppmASTM D5185m1350849915SulfurppmASTM D5185m135025082158OxidationAbs/.1mm*ASTM D7414>2524.820.4Base Number (BN)mg KOHlgASTM D28968.5 A 3.24.7	Soot %	%	*ASTM D7844	>3	0	0	
Siltscalar*VisualNONENONEDebrisscalar*VisualNONENONENONESand/Dirtscalar*VisualNONENONENONEAppearancescalar*VisualNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGSodiumppmASTM D5185m2502117BariumppmASTM D5185m1000ManganeseppmASTM D5185m100301777MagnesiumppmASTM D5185m450682512PhosphorusppmASTM D5185m1350849915SulfurppmASTM D5185m1350849915OxidationAbs/.1mm*ASTM D7414>2524.820.4Base Number (BN)ing KOHigASTM D28968.5 A 3.24.7	Nitration	Abs/cm	*ASTM D7624	>20	14.3	12.6	
Debrisscalar*VisualNONENONESand/Dirtscalar*VisualNONENONENONEAppearancescalar*VisualNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLCodorscalar*VisualNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGSodiumppmASTM D5185m2502117BariumppmASTM D5185m10000MalganeseppmASTM D5185m10030177MagnesiumppmASTM D5185m450682512PhosphorusppmASTM D5185m1150706694ZincppmASTM D5185m1350849915SulfurppmASTM D5185m425025082158OxidationAbs/.1mm*ASTM D7414>2524.820.4Base Number (BN)mg KOHyASTM D28968.5▲ 3.24.7	Sulfation	Abs/.1mm	*ASTM D7415	>30	27.0	22.4	
Sand/Dirtscalar*VisualNONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGSodiumppmASTM D5185m58BoronppmASTM D5185m1000BariumppmASTM D5185m100301777ManganeseppmASTM D5185m10044MagnesiumppmASTM D5185m300013181545PhosphorusppmASTM D5185m1150682512ZincppmASTM D5185m1350849915SulfurppmASTM D5185m1350849915OxidationAbs/.1mm*ASTM D7414>2524.820.4Base Number (BN)mg KOHyASTM D28968.54.7	Silt	scalar	*Visual	NONE	NONE	NONE	
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Sodium ppm ASTM D5185m 5 8 Boron ppm ASTM D5185m 250 21 17 Barium ppm ASTM D5185m 10 0 0 Malybdenum ppm ASTM D5185m 100 30 177 Manganese ppm ASTM D5185m 100 30 177 Magnesium ppm ASTM D5185m 100 4 Calcium ppm ASTM D5185m 450 682 512 Phosphorus ppm ASTM D5185m 3000 1318 1545 Zinc ppm ASTM D5185m 1150 706 694 Sulfur ppm ASTM D5185m 1350 849 915 Oxidation Abs/.1mm *ASTM D714 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896 8.5 <th>Odor</th> <th>scalar</th> <th>*Visual</th> <th>NORML</th> <th>NORML</th> <th>NORML</th> <th></th>	Odor	scalar	*Visual	NORML	NORML	NORML	
Boron ppm ASTM D5185m 250 21 17 Barium ppm ASTM D5185m 10 0 0 Molybdenum ppm ASTM D5185m 100 30 177 Manganese ppm ASTM D5185m 100 30 177 Magnesium ppm ASTM D5185m 100 4 Calcium ppm ASTM D5185m 450 682 512 Calcium ppm ASTM D5185m 3000 1318 1545 Phosphorus ppm ASTM D5185m 1150 706 694 Zinc ppm ASTM D5185m 1350 849 915 Sulfur ppm ASTM D5185m 4250 2508 2158 Oxidation Abs/.1mm<*ASTM D7414 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896	Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	
Boron ppm ASTM D5185m 250 21 17 Barium ppm ASTM D5185m 10 0 0 Molybdenum ppm ASTM D5185m 100 30 177 Manganese ppm ASTM D5185m 100 30 177 Magnesium ppm ASTM D5185m 100 4 Calcium ppm ASTM D5185m 450 682 512 Calcium ppm ASTM D5185m 3000 1318 1545 Phosphorus ppm ASTM D5185m 1150 706 694 Zinc ppm ASTM D5185m 1350 849 915 Sulfur ppm ASTM D5185m 4250 2508 2158 Oxidation Abs/.1mm<*ASTM D7414 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896					_		
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Manganese ppm ASTM D5185m 10 4 Magnesium ppm ASTM D5185m 450 682 512 Calcium ppm ASTM D5185m 3000 1318 1545 Phosphorus ppm ASTM D5185m 1150 706 694 Zinc ppm ASTM D5185m 1350 849 915 Sulfur ppm ASTM D5185m 4250 2508 2158 Oxidation Abs/.1mm *ASTM D7414 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896 8.5 ▲ 3.2 4.7							
Magnesium ppm ASTM D5185m 450 682 512 Calcium ppm ASTM D5185m 3000 1318 1545 Phosphorus ppm ASTM D5185m 1150 706 694 Zinc ppm ASTM D5185m 1350 849 915 Sulfur ppm ASTM D5185m 4250 2508 2158 Oxidation Abs/.1mm *ASTM D7414 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896 8.5 ▲ 3.2 4.7	-	ppm		100			
Calcium ppm ASTM D5185m 3000 1318 1545 Phosphorus ppm ASTM D5185m 1150 706 694 Zinc ppm ASTM D5185m 1350 849 915 Sulfur ppm ASTM D5185m 4250 2508 2158 Oxidation Abs/.1mm *ASTM D7414 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896 8.5 ▲ 3.2 4.7	•						
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Oxidation Abs/.1mm *ASTM D7414 >25 24.8 20.4 Base Number (BN) mg KOH/g ASTM D2896 8.5 3.2 4.7							
Base Number (BN) mg KOH/g ASTM D2896 8.5 🔺 3.2 4.7		ppm		4250			
	Oxidation	Abs/.1mm	*ASTM D7414	>25			
Visc @ 100°C cSt ASTM D445 10.9 🔺 12.9 / 10.5	Base Number (BN)	mg KOH/g	ASTM D2896	8.5	A 3.2	4.7	
	Visc @ 100°C	cSt	ASTM D445	10.9	12.9	10.5	





Contact/Location: SCOTT SULLIVAN - MSCDUR