

## [400402] 16-8112 **Diesel Engine**

## VOLVO ULTRA DIESEL ENGINE OIL 15W40 VDS-3 (--- GAL)

RECOMMENDATION

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor. No other corrective action is recommended at this time.

WEAR			

All component wear rates are normal.

## CONTAMINATION

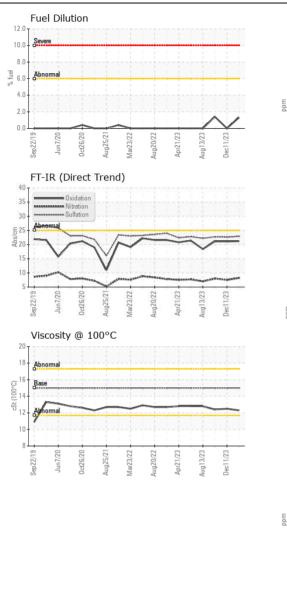
Light fuel dilution occurring. No other contaminants were detected in the oil.

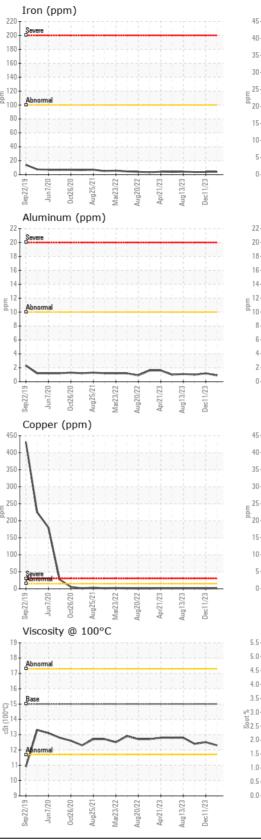
## **FLUID CONDITION**

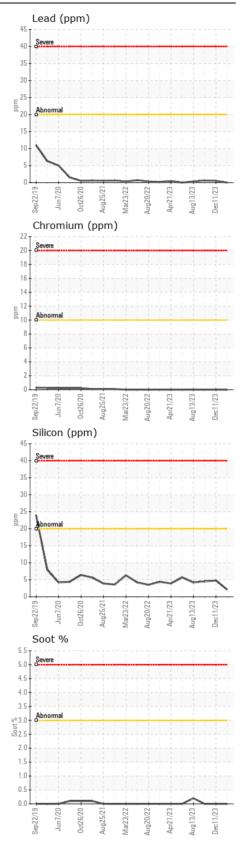
The condition of the oil is acceptable for the time in service.

Sample DateClient Info10 Apr 202411 Dec 202325 Oct 202Machine AgehrsClient Info1000095009000Oil AgehrsClient Info500500500Filter AgehrsClient Info05000Oil ChangedClient InfoChangedChangedChangedChangedFilter ChangedImageClient InfoImageChangedChangedChanged				/	· · · · · · · · · · · · · · · · · · ·		
Sample DateClient InfoID & Day 20211 De 20232 2 Oct 202Machine AgehrsClient InfoID00095009000Oil AgehrsClient InfoS005000Filter AgehrsClient InfoChangedChangedChangedChangedFilter ChangedClient InfoChangedChangedChangedChangedFilter ChangedClient InfoChangedChangedChangedChangedSample StatusClient InfoChangedChangedChangedChangedIronppmASTMD51851>100444ChromiumppmASTMD51851>100G000NickelppmASTMD51851>10G111<1ItaniumppmASTMD51851>10G1111LeadppmASTMD51851>10G1112CopperppmASTMD51851>10G1112TinppmASTMD51851>10G1112SilconppmASTMD51851>10G1112SilconppmASTMD51851>10G11010SilconppmASTMD51851>20G11010SilconppmASTMD51851>20G11010SilconppmASTMD51851>20G11010SilconppmASTMD51851>20G11	Test	UOM	Method	Limit/Abn	Current	History1	History2
Machine AgehrsClient InfoI000095009000Oil AgehrsClient Info500500500Filter AgehrsClient InfoChangedChangedChangedChangedOil ChangedClient InfoMChangedChangedChangedChangedFilter ChangedMClient InfoMChangedChangedChangedSample StatusVVMMMMIronppmASTMD5185(m)>100444ChromiumppmASTMD5185(m)>10C111NickelppmASTMD5185(m)>10C110SilverppmASTMD5185(m)>200<11LeadppmASTMD5185(m)>10C111LeadppmASTMD5185(m)>10000VanadiumppmASTMD5185(m)>10000VanadiumppmASTMD5185(m)>10000SiliconppmASTMD5185(m)>201.31.01.4VanadiumppmASTMD5185(m)>201.31.01.4PotassiumppmASTMD5185(m)>201.31.01.4SiliconppmASTMD5185(m)>201.31.01.4SiliconppmASTMD5185(m)>201.31.01.4SiliconppmASTMD5185(m) <td< th=""><th>Sample Number</th><th></th><th>Client Info</th><th></th><th>VCP393869</th><th>VCP430141</th><th>VCP380506</th></td<>	Sample Number		Client Info		VCP393869	VCP430141	VCP380506
Cili Age Filter AgeIrssClient Into500500500Filter AgeIrssClient IntoChangedChangedChangedChangedGli ChangedIClient IntoChangedChangedChangedChangedFilter ChangedIClient IntoChangedChangedChangedChangedSample StatusINORMALNORMALNORMALNORMALNORMALIronppmASTM5185(m)>100444ChromiumppmASTM5185(m)>100000NickelppmASTM5185(m)>10111TitaniumppmASTM5185(m)>200<11LeadppmASTM5185(m)>10000VanadiumppmASTM5185(m)>20111LeadppmASTM5185(m)>20100VanadiumppmASTM5185(m)>20111LeadppmASTM5185(m)>20100SiliconppmASTM5185(m)>20131SiliconppmASTM5185(m)>20111LeadppmASTM5185(m)>20131SiliconppmASTM5185(m)>20131SiliconppmASTM5185(m)>20131SiliconppmASTM5185(m)>20 </th <th>Sample Date</th> <th></th> <th>Client Info</th> <th></th> <th>10 Apr 2024</th> <th>11 Dec 2023</th> <th>25 Oct 2023</th>	Sample Date		Client Info		10 Apr 2024	11 Dec 2023	25 Oct 2023
Filter AgehrsClient Info05000Oil ChangedClient InfoChangedChangedChangedChangedChangedFilter ChangedQClient InfoChangedChangedChangedChangedChangedSample StatusVNORMALNORMALNORMALNORMALNORMALIronppmASTM05186m>1004444ChroniumppmASTM05186m>100C000NickelppmASTM05186m>10C0000SilverppmASTM05186m>200<1111LeadppmASTM05186m>10C00 <th>Machine Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>10000</th> <th>9500</th> <th>9000</th>	Machine Age	hrs	Client Info		10000	9500	9000
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Filter Changed Sample StatusClient IntoChanged NORMALChanged NORMALChanged NORMALChanged NORMALChanged NORMALIronppmASTM D5185(m)>1004444ChromiumppmASTM D5185(m)>100000NickelppmASTM D5185(m)>10c11c1c1TitaniumppmASTM D5185(m)>20c100SilverppmASTM D5185(m)>200c1c11LeadppmASTM D5185(m)>200c1c1c1CopperppmASTM D5185(m)>200000VanadiumppmASTM D5185(m)>20254PotassiumppmASTM D5185(m)>20c1000SiliconppmASTM D5185(m)>20c1000SulfationAbs/mASTM D5185(m)>20c1000SulfationAbs/mASTM D5185(m)>20c1000SulfationAbs/mASTM D5185(m)>20a.2542Soot %%ASTM D7844'>3O000SulfationAbs/mASTM D7185(m)2.2a.25a.22.2SodiumppmASTM D5185(m)0.00100SulfationAbs/mA	Filter Age	hrs	Client Info		0	500	0
Sample StatusVORMALNORMALNORMALNORMALIronppmASTM D5185(m)>100444ChromiumppmASTM D5185(m)>10000NickelppmASTM D5185(m)>10c11c1TitaniumppmASTM D5185(m)>20c10SilverppmASTM D5185(m)>20c11LeadppmASTM D5185(m)>200c1c1CopperppmASTM D5185(m)>200c1c1TinppmASTM D5185(m)>20000VanadiumppmASTM D5185(m)>20254PotassiumppmASTM D5185(m)>20c100SiliconppmASTM D5185(m)>20c100Fuel%ASTM D5185(m)>20c100GlycolWC Method>0.1NEGNEGNEGSoot %%ASTM D7844>3000SulfationAbs/mASTM D5185(m)2.232c2.7BoronppmASTM D5185(m)2.0REGNEGNEGSodiumppmASTM D5185(m)0.00-10MargensiumppmASTM D5185(m)0.021.622.7BoronppmASTM D5185(m)0.00-10Molybdenumppm	Oil Changed		Client Info		Changed	Changed	Changed
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Chromium ppm ASTM D5165(m) >10 0 0   Nickel ppm ASTM D5165(m) >10 <1 1 <1   Titanium ppm ASTM D5165(m) >20 0 <10 0   Silver ppm ASTM D5165(m) >2 0 <11 1   Lead ppm ASTM D5165(m) >20 0 <11 1   Lead ppm ASTM D5165(m) >20 0 <11 21   Copper ppm ASTM D5165(m) >10 0 0 0   Vanadium ppm ASTM D5165(m) >20 2 5 4   Potassium ppm ASTM D5165(m) >20 2 5 4   Potassium ppm ASTM D5165(m) >20 c1 0 0   Fuel % ASTM D5165(m) >20 c1 0 0   Solicon ppm ASTM D5165(m) >20 c1 0 <th>Sample Status</th> <th></th> <th></th> <th></th> <th>NORMAL</th> <th>NORMAL</th> <th>NORMAL</th>	Sample Status				NORMAL	NORMAL	NORMAL
Chromium ppm ASTM D5165(m) >10 0 0   Nickel ppm ASTM D5165(m) >10 <1 1 <1   Titanium ppm ASTM D5165(m) >20 0 <10 0   Silver ppm ASTM D5165(m) >2 0 <11 1   Lead ppm ASTM D5165(m) >20 0 <11 1   Lead ppm ASTM D5165(m) >20 0 <11 21   Copper ppm ASTM D5165(m) >10 0 0 0   Vanadium ppm ASTM D5165(m) >20 2 5 4   Potassium ppm ASTM D5165(m) >20 2 5 4   Potassium ppm ASTM D5165(m) >20 c1 0 0   Fuel % ASTM D5165(m) >20 c1 0 0   Solicon ppm ASTM D5165(m) >20 c1 0 <th>Iron</th> <th></th> <th></th> <th>. 100</th> <th>л</th> <th>л</th> <th>л</th>	Iron			. 100	л	л	л
NickelppmASTM D5185(m)>10<1			. ,		-		
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Silver ppm ASTM D5185(m) >2 0 <1				>10			
Aluminum ppm ASTM D5185(m) >10 <1			· · /	~2			
Lead ppm ASTM D5185(m) >20 0 <1			( )				
Copper ppm ASTM D5185(m) >15 2 1 2   Tin ppm ASTM D5185(m) >10 0 0 0   Vanadium ppm ASTM D5185(m) >20 2 5 4   Potassium ppm ASTM D5185(m) >20 21 0 0   Silicon ppm ASTM D5185(m) >20 21 0 0   Silicon ppm ASTM D5185(m) >20 21 0 0   Fuel % ASTM D5185(m) >20 21 0 1.4   Water V WC Method >0.1 NEG NEG NEG   Soot % % ASTM D7624* >20 8.2 7.5 8.0   Sulfation Abs/cm ASTM D5185(m) 2.0 REG NEG NEG   Sodium ppm ASTM D5185(m) 2.0 8.2 7.5 8.0   Sodium ppm ASTM D5185(m) 0.0 <			· /				
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Vanadium ppm ASTM D5185(m) C 0 0 0   Silicon ppm ASTM D5185(m) >20 2 5 4   Potassium ppm ASTM D5185(m) >20 <1 0 0   Fuel % ASTM D5185(m) >20 <1 0 0   Water // ASTM D5185(m) >20 <1 0 0   Glycol WC Method >0.1 NEG NEG NEG   Soot % % ASTM D7844 >3 0 0 0   Nitration Abs/cm ASTM D7624* >20 8.2 7.5 8.0   Sulfation Abs/.1mm ASTM D7154* >30 22.9 22.6 22.7   Emulsified Water scalar Visual* >0.1 NEG NEG NEG   Sodium ppm ASTM D5185(m) 2.1 NEG NEG NEG   Barium ppm ASTM D5185(m) 0.0 0			· · /				
SiliconppmASTM D5185(m)>20254PotassiumppmASTM D5185(m)>20<1			( )	210			
Potassium ppm ASTM D5185(m) >20 <1							•
Fuel%ASTM D7593*>6.01.3<1.0	Silicon	ppm	ASTM D5185(m)	>20	2	5	4
WaterWC Method>0.1NEGNEGNEGGlycolWC MethodNEGNEGNEGSoot %%ASTM D7844*>300NitrationAbs/cmASTM D7624*>208.27.58.0SulfationAbs/tmmASTM D7415*>3022.922.622.7Emulsified WaterscalarVisual*>0.1NEGNEGNEGSodiumppmASTM D5185(m)2.54003726BariumppmASTM D5185(m)0.00<10MaganeseppmASTM D5185(m)0.0414040MagnesiumppmASTM D5185(m)2057171116871717PhosphorusppmASTM D5185(m)2057108110671069SulfurppmASTM D5185(m)225239423472345OxidationAbs/tmASTM D5185(m)22.521.221.121.1	Potassium	ppm	ASTM D5185(m)	>20	<1	0	0
GlycolWC MethodNEGNEGNEGSoot %%ASTM D7844*>3000NitrationAbs/cmASTM D7624*>208.27.58.0SulfationAbs/tmASTM D7624*>3022.922.622.7Emulsified WaterscalarVisual*>0.1NEGNEGNEGSodiumppmASTM D5185(m).232BoronppmASTM D5185(m)2.540037726BariumppmASTM D5185(m)0.00<10MolybdenumppmASTM D5185(m)0.06100MagnesiumppmASTM D5185(m)2.5514502497CalciumppmASTM D5185(m)2057171116871717PhosphorusppmASTM D5185(m)33932901904ZincppmASTM D5185(m)1223108110671069SulfurppmASTM D5185(m)25521.221.121.1	Fuel	%	ASTM D7593*	>6.0	1.3	<1.0	1.4
Soot % % ASTM D7844* >3 0 0 0   Nitration Abs/cm ASTM D7624* >20 8.2 7.5 8.0   Sulfation Abs/.1mm ASTM D7415* >30 22.9 22.6 22.7   Emulsified Water scalar Visual* >0.1 NEG NEG NEG   Sodium ppm ASTM D5185(m) 2.5 40 37 26   Baron ppm ASTM D5185(m) 0.0 0 <1 0   Molybdenum ppm ASTM D5185(m) 0.0 0 <1 0   Magnesium ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 2057 1111 1687 1717      Phosphorus ppm ASTM	Water		WC Method	>0.1	NEG	NEG	NEG
NitrationAbs/cmASTM D7624*>208.27.58.0SulfationAbs/.1mmASTM D7415*>3022.922.622.7Emulsified WaterscalarVisual*>0.1NEGNEGNEGSodiumppmASTM D5185(m)2.5403726BariumppmASTM D5185(m)0.00<10MolybdenumppmASTM D5185(m)0.00<10MagnesiumppmASTM D5185(m)0.0<100MagnesiumppmASTM D5185(m)2057171116871717PhosphorusppmASTM D5185(m)1223108110671069SulfurppmASTM D5185(m)1223108110672345OxidationAbs/.1mmASTM D5185(m)25521.221.121.1	Glycol		WC Method		NEG	NEG	NEG
SulfationAbs/.1mmASTM D7415*>3022.922.622.7Emulsified WaterscalarVisual*>0.1NEGNEGNEGSodiumppmASTM D5185(m)232BoronppmASTM D5185(m)2.54003726BariumppmASTM D5185(m)0.00<10MolybdenumppmASTM D5185(m)0.00<10ManganeseppmASTM D5185(m)0.0<100MagnesiumppmASTM D5185(m)2057171116871717PhosphorusppmASTM D5185(m)932901904ZincppmASTM D5185(m)1223108110671069SulfurppmASTM D5185(m)25521.221.121.1	Soot %	%	ASTM D7844*	>3	0	0	0
Emulsified Water scalar Visual* >0.1 NEG NEG NEG   Sodium ppm $ASTM D5185(m)$ 2 3 2   Boron ppm $ASTM D5185(m)$ 2.5 40 37 26   Barium ppm $ASTM D5185(m)$ 0.0 0 <1 0   Molybdenum ppm $ASTM D5185(m)$ 0.0 41 40 40   Manganese ppm $ASTM D5185(m)$ 0.0 <1 0 0   Magnesium ppm $ASTM D5185(m)$ 0.0 <1 0 0   Phosphorus ppm $ASTM D5185(m)$ 0.0 <1 0 0   Zinc ppm $ASTM D5185(m)$ 2057 1711 1687 1717   Phosphorus ppm $ASTM D5185(m)$ 932 901 904   Zinc ppm $ASTM D5185(m)$ 1223 1081 1067 1069   Sulfur ppm $ASTM D5185(m)$	Nitration	Abs/cm	ASTM D7624*	>20	8.2	7.5	8.0
Sodium ppm ASTM D5185(m) 2 3 2   Boron ppm ASTM D5185(m) 2.5 40 37 26   Barium ppm ASTM D5185(m) 0.0 0 <1 0   Molybdenum ppm ASTM D5185(m) 0.0 0 <1 0   Manganese ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 0.0 <1 0 0   Calcium ppm ASTM D5185(m) 2057 1111 1687 1717   Phosphorus ppm ASTM D5185(m) 2057 1711 1687 1717   Phosphorus ppm ASTM D5185(m) 2057 1711 1687 1069   Zinc ppm ASTM D5185(m) 2057 1711 1687 1069   Sulfur ppm ASTM D5185(m) 1223 1081 1067 1069   Sulfur ppm ASTM D5185(m)	Sulfation	Abs/.1mm		>30	22.9	22.6	22.7
Boron ppm ASTM D5185(m) 2.5 40 37 26   Barium ppm ASTM D5185(m) 0.0 0 <1 0   Molybdenum ppm ASTM D5185(m) 0.0 0 <1 0   Manganese ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 256 514 502 497   Calcium ppm ASTM D5185(m) 2057 1711 1687 1717   Phosphorus ppm ASTM D5185(m) 935 932 901 904   Zinc ppm ASTM D5185(m) 1223 1081 1067 1069   Sulfur ppm ASTM D5185(m) 255 21.2 21.1 21.1	Emulsified Water	scalar	Visual*	>0.1	NEG	NEG	NEG
Boron ppm ASTM D5185(m) 2.5 40 37 26   Barium ppm ASTM D5185(m) 0.0 0 <1 0   Molybdenum ppm ASTM D5185(m) 0.0 0 <1 0   Manganese ppm ASTM D5185(m) 0.0 <1 0 0   Magnesium ppm ASTM D5185(m) 0.0 <1 0 0   Calcium ppm ASTM D5185(m) 2057 1711 1687 1717   Phosphorus ppm ASTM D5185(m) 935 932 901 904   Zinc ppm ASTM D5185(m) 1223 1081 1067 1069   Sulfur ppm ASTM D5185(m) 4079 2394 2347 2345   Oxidation Abs/.1mm ASTM D7414' >25 21.2 21.1 21.1	Sodium	ppm	ASTM D5185(m)		2	3	2
Barium ppm ASTM D5185(m) 0.0 0 <1	Boron		ASTM D5185(m)	2.5	40	37	26
Manganese ppm ASTM D5185(m) 0.0 <1	Barium			0.0	0	<1	0
Manganese ppm ASTM D5185(m) 0.0 <1	Molybdenum	ppm	ASTM D5185(m)	0.7	41	40	40
Calcium ppm ASTM D5185(m) 2057 1711 1687 1717   Phosphorus ppm ASTM D5185(m) 935 932 901 904   Zinc ppm ASTM D5185(m) 1223 1081 1067 1069   Sulfur ppm ASTM D5185(m) 4079 2394 2347 2345   Oxidation Abs/.1mm ASTM D7414* >25 21.2 21.1 21.1			ASTM D5185(m)		<1	0	0
Phosphorus ppm ASTM D5185(m) 935 932 901 904   Zinc ppm ASTM D5185(m) 1223 1081 1067 1069   Sulfur ppm ASTM D5185(m) 4079 2394 2347 2345   Oxidation Abs/.1mm ASTM D7414* >25 21.2 21.1 21.1	Magnesium	ppm	ASTM D5185(m)	256	514	502	497
Zinc ppm ASTM D5185(m) 1223 1081 1067 1069   Sulfur ppm ASTM D5185(m) 4079 2394 2347 2345   Oxidation Abs/.1mm ASTM D7414* >25 21.2 21.1 21.1	Calcium	ppm	ASTM D5185(m)	2057	1711	1687	1717
Sulfur ppm ASTM D5185(m) 4079 2394 2347 2345   Oxidation Abs/.1mm ASTM D7414* >25 21.2 21.1 21.1	Phosphorus	ppm	ASTM D5185(m)	935	932	901	904
Oxidation Abs/.1mm ASTM D7414* >25 21.2 21.1 21.1	Zinc	ppm	ASTM D5185(m)	1223	1081	1067	1069
	Sulfur	ppm	ASTM D5185(m)	4079	2394	2347	2345
Visc @ 100°C cSt ASTM D7279(m) 15.0 12.3 12.5 12.4	Oxidation	Abs/.1mm	ASTM D7414*	>25	21.2	21.1	21.1
	Visc @ 100°C	cSt	ASTM D7279(m)	15.0	12.3	12.5	12.4

Contact/Location: Dan Brown - HOLCON







CRH CANADA GROUP INC. Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 CALA Sample No. : VCP393869 Received : 17 Apr 2024 Lab Number : 02629548 Tested : 19 Apr 2024 ISO 17025:2017 Accredited Laboratory : 19 Apr 2024 - Wes Davis Unique Number : 5762680 Diagnosed Test Package : MOB 1 (Additional Tests: FUELDILUTION, PercentFuel) To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (\*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

P.O. BOX 5400 CONCORD, ON CA L4K 1B6 Contact: Dan Brown dan.brown@ca.crh.com T:

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