OIL ANALYSIS REPORT

503021 VOLVO PENTA A 1 1 24844 - STARBOARD DIESEL ENGINE

Sample No: VPA058308

Oil Type: VOLVO ULTRA DIESEL ENGINE OIL 15W40 VDS-3

Jample Number In Norson Sample Date 19 Mar 2024 Machine Hours 0 Oil Hours 0 Sample Status NORMAL DI CONDITION Visc @ 100°C CSt 112.8 Di CONDITION Visc @ 100°C CSt 112.8 Di CONDITION Visc @ 100°C CSt 112.8 Di CONDITION Visc @ 100°C St 10.2 Oxidation (PA) % ST Soti % % 0.1 Soti % % NEG Solduin (PA) % S1 <	Sample Number		VPA058308	 	
Machine Hours169Oil Hours0Sample StatusNoRMALSoli ConjurionNoRMALVisc @ 100°CCSt12.8Base Number (BN)mg KOH/g10.2Cuttamine (BN)mg KOH/g10.2Cuttamine (BN)mg KOH/g10.2Nater%NEGSoot %%0.1Nitration (PA)%42Sulfation (PA)%42Sulfation (PA)%51Sodiumppm8Sodiumppm1Sodiumppm1Sodiumppm18Sodiumppm6Sodiumppm1Sodiumppm1Sodiumppm6 <t< td=""><td>•</td><td></td><td></td><td></td><td></td></t<>	•				
Oil Hours O Oil Changed Not Changd Sample Status No RMAL OIL CONDITION Visc © 100°C CSt 12.8 Base Number (BN) mg KOH/g 10.2 CONTAMINATION Water % S7 Solf Xion (PA) % 12 Sulfation (PA) % 12 Sulfation (PA) % 12 Sulfation (PA) % 10 Sodium ppm 18					
Not Changed Not Changed Sample Status NORMAL OIL CONDITION Base Number (BN) mg KOH/g 10.2 Coxidation (PA) % 57 CONTAMINATION *** Water % 0.1 Soltation (PA) % 42 Sulfation (PA) % 410 Sulfation (PA) % <1.0					
Sample Status NORMAL e e e OIL CONDITION Base Number (BN) mg KOH/g 10.2 Cxidation (PA) % 57 CONTAMINATION Water % NEG Soot % % 10.1 Soot % % 10.1 Station (PA) % 51 Suifation (PA) % 1.0 Suifation (PA) % 1.0 Soligation (PA) % 1.0 Soligation (PA) Ppm 1 Soligation ppm 18					
OIL CONDITION Visc @ 100°C CSt 112.8 Base Number (BN) mg KOH/g 10.2 Oxidation (PA) % 57 CONTAMINATION Water % 10.1 Soci % 10.1 Soci % 10.1 Nitration (PA) % 42 Sulfation (PA) % 41.0 Solicon ppm 1 Solicon ppm 18 WEAR METALS Ital a			-		
Visc @ 100°C cSt 112.8 Base Number (BN) mg KOH/g 10.2 Oxidation (PA) % 57 COTTAMINATION % 57 Water % NEG Soot % % 0.1 Soot % % 51 Sulfation (PA) % S1 Sulfation (PA) % S1 Fuel % <1.0	Sample Status		HORMAE		
Base Number (BN) mg KOH/g 10.2 Oxidation (PA) % 57 COTTAMINATION Water % NEG Soot % % 0.1 Soot % % 51 Sulfation (PA) % 42 Glycol % NEG Fuel % <1.0	OIL CONDITION				
Oxidation (PA) % 57 CONTAMINATION Water % NEG Solt% % 0.1 Nitration (PA) % 42 Sulfation (PA) % 51 Glycol % NEG Glycol % NEG Solifation (PA) % <10 Solifation (PA) % <11 Glycol % <10 Solifation (PA) % <10 Soliform ppm 18 Magenesity ppm 11 Aluminum	Visc @ 100°C	cSt	12.8	 	
CONTAMINATION Water % NEG Soot % % 0.1 Nitration (PA) % 42 Sulfation (PA) % 51 Glycol % NEG Fuel % <1.0	Base Number (BN)	mg KOH/g	10.2	 	
Water % NEG Soot % % 0.1 Nitration (PA) % 42 Sulfation (PA) % 51 Glycol % NEG Fuel % <1.0	Oxidation (PA)	%	57	 	
Water % NEG Soot % % 0.1 Nitration (PA) % 42 Sulfation (PA) % 51 Glycol % NEG Fuel % <1.0	CONTAMINATION				
Soot % % 0.1 Nitration (PA) % 42 Sulfation (PA) % 51 Glycol % NEG Fuel % <1.0		0(NEC		
Nitration (PA) % 42 Sulfation (PA) % S1 Glycol % NEG Fuel % <1.0					
Sulfation (PA) % 51 Glycol % NEG Fuel % <1.0					
Glycol % NEG Fuel % <1.0	. ,				
Fuel % <1.0 Silicon ppm 8 Sodium ppm 1 Potassium ppm 2 WEAR METALS Iron ppm 18 Copper ppm 6 Lead ppm 1 Aluminum ppm 66 Aluminum ppm 1 Molybdenum ppm 61 Nickel ppm 2 Silver ppm <1					
Silicon ppm 1 Sodium ppm 1 Potassium ppm 2 WEAR METALS Iron ppm 18 Copper ppm 6 Lead ppm 1 Aluminum ppm 6 Aluminum ppm 61 Nickel ppm 21 Nickel ppm 21 Silver ppm <1					
Sodium ppm 1 Potassium ppm 2 WEAR METALS Iron ppm 18 Copper ppm 6 Lead ppm 2 Aluminum ppm 6 Aluminum ppm 6 Molybdenum ppm 6 Nickel ppm 2 Silver ppm <1					
Potassium ppm 2 WEAR METALS Copper ppm 18 Lead ppm 2 Aluminum ppm 66 Aluminum ppm 66 Molybdenum ppm 661 Molybdenum ppm 21 Molybdenum ppm 21 Silver ppm 21 Manganese ppm 21 ADUITIVES Magnesium					
WEAR METALS Iron ppm 18 Copper ppm 6 Lead ppm 2 Aluminum ppm 6 Aluminum ppm 6 Chromium ppm 61 Molybdenum ppm 61 Nickel ppm 2 Nickel ppm <1					
Iron ppm 18 Copper ppm 6 Lead ppm 2 Tin ppm 1 Aluminum ppm 6 Aluminum ppm 6 Molybdenum ppm 61 Molybdenum ppm 2 Nickel ppm 2 Silver ppm <1	Potassium	ppm	2	 	
Copper ppm 66 Lead ppm 2 Tin ppm 1 Aluminum ppm 6 Aluminum ppm 6 Chromium ppm 61 Molybdenum ppm 61 Nickel ppm 2 Silver ppm <1	WEAR METALS				
Copper ppm 6 Lead ppm 2 Tin ppm 1 Aluminum ppm 6 Chromium ppm 61 Molybdenum ppm 61 Nickel ppm 2 Nickel ppm <1	Iron	ppm	1 8	 	
Lead ppm 2 Tin ppm 1 Aluminum ppm 6 Chromium ppm 1 Molybdenum ppm 61 Nickel ppm 2 Nickel ppm <1	Copper			 	
Tin ppm 1 Aluminum ppm 6 Chromium ppm 1 Molybdenum ppm 61 Nickel ppm 2 Nickel ppm <1				 	
Aluminum ppm 6 Chromium ppm 1 Molybdenum ppm 61 Nickel ppm 2 Titanium ppm <1	Tin		∎1	 	
Chromium ppm 1 Molybdenum ppm 61 Nickel ppm 2 Titanium ppm <1	Aluminum			 	
Molybdenum ppm 61 Nickel ppm 2 Titanium ppm <1	Chromium			 	
Nickel ppm 2 Titanium ppm <1	Molybdenum			 	
Titanium ppm <1			2	 	
Silver ppm <1 Manganese ppm <1	Titanium		 <1	 	
Manganese ppm <1 Vanadium ppm <1 ADDITIVES Calcium ppm 1141 Magnesium ppm 935 Zinc ppm 1204 Phosphorus ppm 0 Barium ppm 0	Silver			 	
Vanadium ppm <1 ADDITIVES Calcium ppm 1141 Magnesium ppm 935 Zinc ppm 1204 Phosphorus ppm 1029 Barium ppm 0	Manganese		 <1	 	
Calcium ppm 1141 Magnesium ppm 935 Zinc ppm 1204 Phosphorus ppm 1029 Barium ppm 0	Vanadium	ppm	<1	 	
Calcium ppm 1141 Magnesium ppm 935 Zinc ppm 1204 Phosphorus ppm 1029 Barium ppm 0	ADDITIVES				
Magnesium ppm 935 Zinc ppm 1204 Phosphorus ppm 1029 Barium ppm 0		maa	1141	 	
Zinc ppm 1204 Phosphorus ppm 1029 Barium ppm 0					
Phosphorus ppm 1029 Barium ppm 0					
Barium ppm 0					
	-				

VOLVO PENTA

orth Harbor Diesel Inc 0 30Th Street ACORTES, WA 98221 ntact: ED MCFARLIN @northharbordiesel.com

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esample at the next service interval monitor.All component wear rates e normal. There is no indication of ny contamination in the oil. The BN sult indicates that there is suitable kalinity remaining in the oil. The ondition of the oil is suitable for rther service.

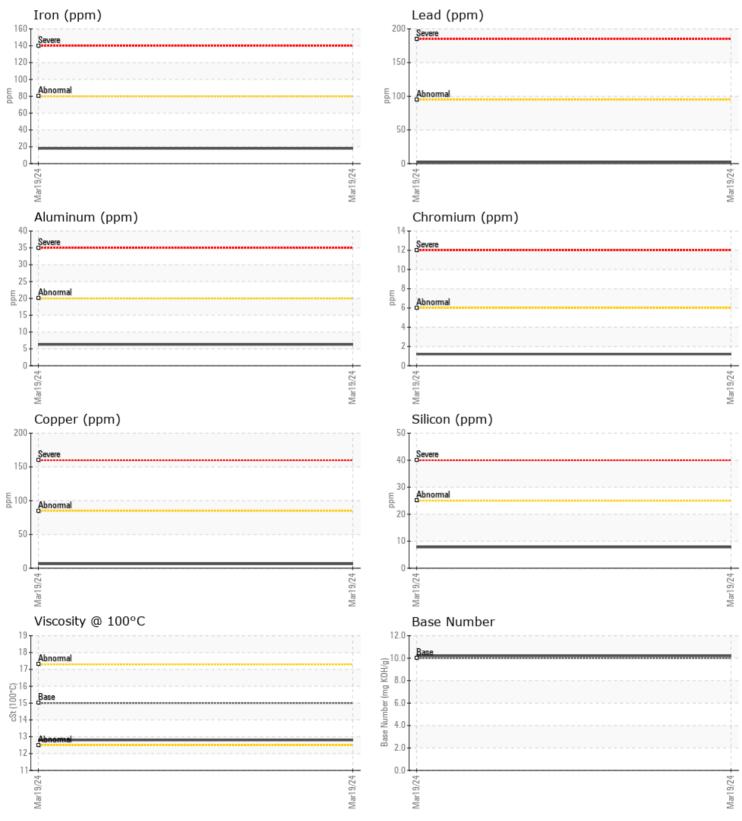
pot: VP179089 ique No: Signed: Report Date:

10951191 Don Baldridge 02 Apr 2024

OIL ANALYSIS REPORT



GRAPHS



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Contact/Location: ED MCFARLIN - VP179089