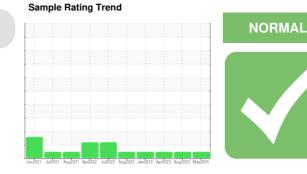


OIL ANALYSIS REPORT

SAMPLE INFORMATION method



Machine Id

CHEVROLET CHEVROLET 2021 DURAMAX

Diesel Engine Fluid

DIAGNOSIS

HIGH PERFORMANCE LUBRICANTS HDEO 5W40 (10 QTS)

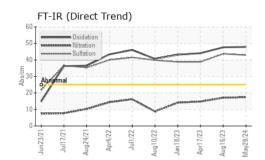
Recommendation Resample at the next service interval to monitor. Wear All component wear rates are normal. Contamination There is no indication of any contamination in the oil. Fluid Condition The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

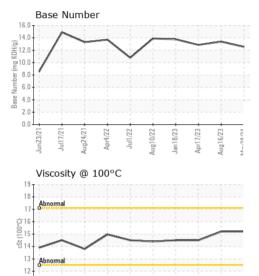
		methou	iiiiii/base	current	TIISTOLA	
Sample Number		Client Info		HPL0004424	HPL0003568	HPL0003680
Sample Date		Client Info		28 May 2024	16 Aug 2023	17 Apr 2023
Machine Age	mls	Client Info		46733	43400	37000
Oil Age	mls	Client Info		25233	21900	15500
Oil Changed		Client Info		Changed	Changed	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	N	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0	<1.0	<1.0
Water		WC Method	>0.2	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	148	132	85
Chromium	ppm	ASTM D5185m	>20	4	4	2
Nickel		ASTM D5185m	>20	4 <1	1	<1
Titanium	ppm ppm	ASTM D5185m	~4	<1	0	< 1
			. 0			÷
Silver	ppm	ASTM D5185m	>3	0	0	<1
Aluminum	ppm	ASTM D5185m	>20	14	13	9
Lead	ppm	ASTM D5185m	>40	4	2	0
Copper	ppm	ASTM D5185m	>330	128	158	197
Tin	ppm	ASTM D5185m	>15	3	2	2
Vanadium	ppm	ASTM D5185m		<1	<1	0
Cadmium	ppm	ASTM D5185m		0	0	0
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 2	history1 0	history2 17
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	2	0	17
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	2 0	0	17 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560	0 4 603	17 0 574
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560 2	0 4 603 2	17 0 574 2
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560 2 930	0 4 603 2 936	17 0 574 2 1001
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560 2 930 2551	0 4 603 2 936 2606 916	17 0 574 2 1001 2722
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560 2 930 2551 929	0 4 603 2 936 2606	17 0 574 2 1001 2722 968
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560 2 930 2551 929 1242	0 4 603 2 936 2606 916 1256 6806	17 0 574 2 1001 2722 968 1292
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	2 0 560 2 930 2551 929 1242 7025 current	0 4 603 2 936 2606 916 1256 6806 history1	17 0 574 2 1001 2722 968 1292 8302 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		2 0 560 2 930 2551 929 1242 7025 current 28	0 4 603 2 936 2606 916 1256 6806 history1 27	17 0 574 2 1001 2722 968 1292 8302 history2 27
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	limit/base	2 0 560 2 930 2551 929 1242 7025 <u>current</u> 28 12	0 4 603 2 936 2606 916 1256 6806 history1 27 10	17 0 574 2 1001 2722 968 1292 8302 history2 27 8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20	2 0 560 2 930 2551 929 1242 7025 current 28 12 28	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 8 21
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	limit/base	2 0 560 2 930 2551 929 1242 7025 current 28 12 28 12 28 current	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 227 8 21 21 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20	2 0 560 2 930 2551 929 1242 7025 current 28 12 28 12 28 28 0.8	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1 0.8	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 27 8 21 history2 0.7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base	2 0 560 2 930 2551 929 1242 7025 current 28 12 28 12 28 current	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 227 8 21 21 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3	2 0 560 2 930 2551 929 1242 7025 current 28 12 28 12 28 28 0.8	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1 0.8	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 27 8 21 history2 0.7
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3 >20	2 0 560 2 930 2551 929 1242 7025 <i>current</i> 28 12 28 12 28 <i>current</i> 0.8 17.4	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1 0.8 17.1	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 27 8 21 27 8 21 0.7 14.8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	Imit/base >25 >20 Imit/base >3 >20 >3 >20 >30	2 0 560 2 930 2551 929 1242 7025 current 28 12 28 12 28 current 0.8 17.4 42.9	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1 0.8 17.1 43.7	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 227 8 21 history2 0.7 14.8 38.8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	limit/base >25 >20 limit/base >3 >20 >30 >30 limit/base	2 0 560 2 930 2551 929 1242 7025 current 28 12 28 28 28 current 0.8 17.4 42.9 current	0 4 603 2 936 2606 916 1256 6806 history1 27 10 30 history1 0.8 17.1 43.7 history1	17 0 574 2 1001 2722 968 1292 8302 history2 27 8 27 8 21 history2 0.7 14.8 38.8 history2



OIL ANALYSIS REPORT

Apr17/23 Aug16/23





Jul17/21-\ug24/21

Apr4/22 ul1/22 ua10/22 lan 18/23

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	LIGHT	NONE	NONE
ellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Ddor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERTI	ES	method	limit/base	current	history1	history2
/isc @ 100°C	cSt	ASTM D445		15.2	15.2	14.5
GRAPHS						
Iron (ppm)			100	Lead (ppm)		
Severe			80	Severe		· · · ·
			60			
Abnormal	<u> </u>		H 40	Abnormal		
	\backslash		20			
					2+	
Jun23/21 Jul17/21 Aug24/21 Apr4/22	- Juli/22 - Aug10/22 -	Jan 18/23 - Apr 17/23 -	May28/24	Jun23/21 Jul17/21 Aug24/21	Apr4/22 - Jul1/22 - Aug10/22 -	Jan 1 0/23 - Apr1 7/23 - Aug 1 6/23 -
	Au	Ar Ar	Ma			Ar Au
Aluminum (ppm)			50	Chromium (opm)	
Severe			40	Severe		
			20			
Abnormal	*****		E 20	Abnormal		
			10			
	\sim		0			
Jun23/21 Jul17/21 Aug24/21 Apr4/22	Jul1/22 Aug10/22	Jan 18/23 Apr 17/23	May28/24	Jun23/21 Jul17/21 Aug24/21	Apr4/22 Jul1/22 Aug10/22	Jan 1 0/23 . Apr1 7/23 . Aug 1 6/23 .
	BnA	Apr	May		A	Apr Aug
Copper (ppm)			100	Silicon (ppm)	
Severe Abnormal	+		80	Severe		
			0	1		
	\mathbf{i}	~	40			
\sim	$\langle \rangle$		20	Abnormal		
	V		0	L <u>i i i</u>		
Jun23/21 Jul17/21 Aug24/21 Apr4/22	- Juli/22 - Aug10/22 -	Jan 18/23 - Apr 17/23 -	May28/24	Jun23/21 Jul17/21 Aug24/21	Apr4/22 - Jul1/22 - Aug 10/22 -	Jan 1 0/23 Apr1 7/23 Aug 1 6/23
	BnA	Apr	May			Api
Viscosity @ 100°C				Base Numbe	r	
	I I I I		15.0 ⊮	\sim	\sim \sim	
Abnormal	+		및 말10.0	/	\sim	
			Base Mumber (mg KOH/g)			
Abnormal			FN 5.0			
			[№]			
Jun23/21 Jul17/21 Aug24/21 Apr4/22	Jul1/22 + Aug10/22 +	Jan 18/23 - Apr 17/23 -	May28/24	Jun23/21+ Jul17/21+ Aug24/21+	Apr4/22 - Jul1/22 - Aug10/22 -	Jan 1 0/23 + Apr1 7/23 + Aug 1 6/23 -
6 F F 7					~ - 0 0	~

: 05 Jun 2024

: 11 Jun 2024

2100 STONECREST DRIVE FORT COLLINS, CO : 11 Jun 2024 - Jonathan Hester Contact: WAYNE WILLSON wayne.willson@gmail.com

To discuss this sample report, contact Customer Service at 1-800-237-1369.

: HPL0004424

* - 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)

Received

Diagnosed

Tested

Report Id: WAYBOI [WUSCAR] 06200834 (Generated: 06/13/2024 21:23:32) Rev: 2

Certificate 12367

Laboratory

Sample No.

Lab Number : 06200834

Unique Number : 11062957

Test Package : MOB 2

Submitted By: WAYNE WILLSON

Page 2 of 2

F:

US 80521

T: (630)399-0850