

OIL ANALYSIS REPORT

Sample Rating Trend







Machine Id **111005** Component **Diesel Engine** Fluid **NOT GIVEN (--- GAL)**

DIAGNOSIS

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

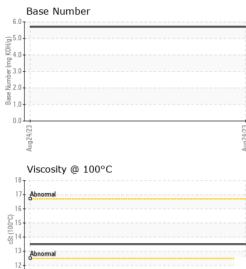
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Sample Number		Client Info		GFL0084513		
Sample Date		Client Info		24 Aug 2023		
Machine Age	hrs	Client Info		3955		
Oil Age	hrs	Client Info		600		
Oil Changed		Client Info		Changed		
Sample Status				NORMAL		
CONTAMINAT	ION	method	limit/base	current	history1	history2
Fuel		WC Method	>5	<1.0		
Glycol		WC Method		NEG		
WEAR METAL	S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>100	22		
Chromium	ppm	ASTM D5185m	>20	2		
Nickel	ppm	ASTM D5185m	>4	<1		
Titanium	ppm	ASTM D5185m		13		
Silver	ppm	ASTM D5185m	>3	0		
Aluminum	ppm	ASTM D5185m	>20	5		
Lead	ppm	ASTM D5185m	>40	2		
Copper	ppm	ASTM D5185m	>330	1		
Tin	ppm	ASTM D5185m	>15	<1		
Vanadium	ppm	ASTM D5185m		<1		
Cadmium	ppm	ASTM D5185m		<1		
ADDITIVES		method				history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 45	history1	history2
	ppm ppm		limit/base			
Boron Barium		ASTM D5185m	limit/base	45		
Boron	ppm	ASTM D5185m ASTM D5185m	limit/base	45 0		
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40		
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40 1		
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40 1 673		
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40 1 673 1506	 	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40 1 673 1506 623	 	
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	45 0 40 1 673 1506 623 787	 	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40 1 673 1506 623 787 3322		
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	45 0 40 1 673 1506 623 787 3322 current		
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base >25	45 0 40 1 673 1506 623 787 3322 current 6	 history1	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base >25	45 0 40 1 673 1506 623 787 3322 current 6 8	 history1	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base	45 0 40 1 673 1506 623 787 3322 current 6 8 17	 history1 	 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3	45 0 40 1 673 1506 623 787 3322 current 6 8 17 current	 history1 history1	 history2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3	45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4	 history1 history1	 history2 history2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN 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	45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 11.5	 history1 history1 	 history2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN 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 >30	45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 11.5 23.4	 history1 history1 history1	 history2 history2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844	limit/base >25 >20 limit/base >3 >20 >30 >30	45 0 40 1 673 1506 623 787 3322 current 6 8 17 current 0.4 11.5 23.4 current	 history1 history1 history1 history1	 history2 history2 history2 history2 history2



11 Aug24/23

OIL ANALYSIS REPORT



v Metal scalar *Visual vitate scalar *Visual scalar *Visual scalar *Visual Dirt scalar *Visual arance scalar *Visual arance scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method 2 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals -ferrous Metals -ferrous Metals	/isual NO /isual NO	1-5 Vn024/23	ONE N ONE N ONE N ONE N ORE N ORML N ORML N 0.2 N Imit/base 1	NONE NONE NONE NONE NORML NEG NEG NEG 13.5		VISUAL	meth	hod limit/b	ase current	history1	history2
v Metal scalar *Visual vitate scalar *Visual scalar *Visual scalar *Visual Dirt scalar *Visual arance scalar *Visual arance scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method 2 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals -ferrous Metals -ferrous Metals	/isual NO /isual NO	NONE NONE NONE NONE NOR NOR NOR NOR NOR NOR NOR NOR NOR NOR	ONE N ONE N ONE N ONE N ORE N ORML N ORML N 0.2 N Imit/base 1	NONE NONE NONE NONE NONE L NORML NEG NEG rase current history1 13.5		White Metal	scalar *Visua	al NONE	NONE		
obitate scalar *Visual scalar *Visual Dirt scalar *Visual Dirt scalar *Visual arance scalar *Visual scalar *Visual scalar *Visual JID PROPERTIES method 20 100°C cSt ASTM D44 APHS ous Alloys iron chromium nickel -ferrous Metals	/isual NO /isual NO /isual NO /isual NO /isual NO /isual NO /isual >0. /isual In STM D445	NONE NONE NONE NORML >0.2 Imit/bas	ONE N ONE N ONE N ORE N ORML N ORML N 0.2 N Imit/base 1	Base Number		Yellow Metal					
scalar *Visual scalar *Visual Dirt scalar *Visual arance scalar *Visual scalar *Visual scalar *Visual Mater scalar *Visual Mater scalar *Visual JID PROPERTIES method 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals	/isual NO /isual NO /isual NO /isual >0. /isual >0. /isual In STM D445	NONE NORML NORML >0.2 Imit/bas	ONE N ONE N ORML N ORML N 0.2 N Iimit/base 1	Base Number		Precipitate					
s scalar *Visual Dirt scalar *Visual arance scalar *Visual scalar *Visual scalar *Visual Mater scalar *Visual Mater scalar *Visual JID PROPERTIES method 2 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals cooper head bosity @ 100°C	/isual NO /isual NO /isual NO /isual >0. /isual >0. /isual In STM D445	NONE NORML NORML >0.2 Imit/bas	ONE N ONE N ORML N ORML N 0.2 N limit/base 1	NONE NORML NEG NEG NEG 13.5		Silt					
arance scalar *Visual scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method 100°C cSt ASTM D44 APHS ous Alloys	/isual NO /isual NO /isual >0. /isual in STM D445	NORML NORML >0.2 Iimit/bas	ORML N ORML N 0.2 N limit/base 1	L NORML NEG NEG ase current history1 13.5		Debris					
scalar *Visual ified Water scalar *Visual Water scalar *Visual JID PROPERTIES method @ 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals -ferrous Metals -ferrous Metals	/isual NO /isual >0. /isual In method In STM D445	NORML >0.2	ORML N 0.2 N Iimit/base 1	L NORML NEG Pase current history1 13.5		Sand/Dirt	scalar *Visua	al NONE	NONE		
ified Water scalar *Visual Vater scalar *Visual JID PROPERTIES method © 100°C cSt ASTM D44 APHS ous Alloys iron chromium nickel -ferrous Metals copper lead tin	/isual >0. /isual Iir STM D445	>0.2 limit/bas 1/5	ORML N 0.2 N Iimit/base 1	L NORML NEG Pase current history1 13.5	Aug24/23						
Vater scalar *Visual JID PROPERTIES method © 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals -ferrous Metals bind bind copper lead tin	/isual lin STM D445	limit/bas 15 br C2/t20ny	0.2 N limit/base 1 control and a second s	NEG NEG ase current history1 13.5	Aug2	Odor	scalar *Visua	al NORM			
JID PROPERTIES method 100°C cSt ASTM D44 APHS ous Alloys -ferrous Metals copper lead bosity @ 100°C	nethod lin STM D445	1-5 Vn024/23	EZ/F20ny EZ/F20ny EZ/F20ny EZ/F20ny EZ/F20ny EZ/F20ny Ba (0)H0y Bul 3.0 1.0	Base Number		Emulsified Water	scalar *Visua	al >0.2			
P 100°C cSt ASTM D44 APHS ous Alloys ferrous Metals copper lead tin	STM D445	1-5 Vn024/23	Ba 6.0 (0)HOX but ya 3.0 (0)HOX but ya 3.0 (0)H	13.5		Free Water	scalar *Visua	al	NEG		
P 100°C cSt ASTM D44 APHS ous Alloys ferrous Metals copper lead tin	STM D445	1-5 Vn024/23	E2/h20ny 6.0 (0)h0y Bul 3.0 1.0	Base Number		FLUID PROPE	RTIES meti	hod limit/b	ase current	history1	history2
ous Alloys		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		Visc @ 100°C					
ous Alloys		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		GRAPHS					
-ferrous Metals		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		Ferrous Alloys					
-ferrous Metals		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		²⁵					
-ferrous Metals		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		20					
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		2.0 nickel					
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		15-					
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		Ē. 10 -					
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOX Du 3.0 2.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		10					
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		5-					
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0							
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0				23			
copper lead tin posity @ 100°C		Aug24/23	E22/HZ ⁰ my 6.0 (0) HOY but 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		Aug24/23		ug24/			
copper lead tin posity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0			la	Aı			
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		10 T	15				
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0							
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0							
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		6-					
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		E					
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		4 4					
osity @ 100°C		Aug24/23	Ba 6.0 (^D HO) Bull a 3.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0							
	Aur.2473		Ba 6.0 5.0 (0) 10) 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0							
	EC/FComA		Ba 6.0 5.0 (0) 10) 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0 1.0	6.0 5.0 (b)HOX bu 1.0 0.0		2-					
	un v		Ba 6.0 5.0 (0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0) 0	6.0 5.0 (b)HOX bu 1.0 0.0		2					
		asse Muncher (mn KDH ki)	6.0 5.0 (0) 100 4.0 100 100 100 100 100 100 100 100 100 1	6.0 5.0 (b)HOX bu 1.0 0.0				24/23			
ma		Asse Mumber (mrt KDH/n)	6.0 5.0 (0) 100 4.0 100 100 100 100 100 100 100 100 100 1	6.0 5.0 (b)HOX bu 1.0 0.0		2		Aug24/23			
mal		Base Mumber (non KOH/n)	(0) HOX 4.0 - Bu Ja 3.0 - emm 2.0 - 1.0 -	(b) 4.0 is guing 3.0 2.0 1.0 0.0		Viscosity @ 100°C		Aug24/23 +	Base Num	her	
		Base Mumber (Mrr COHA)	(0) HOX 4.0 - Bu Ja 3.0 - emm 2.0 - 1.0 -	(b) 4.0 is guing 3.0 2.0 1.0 0.0		Viscosity @ 100°C		Aug24/23		ber	
		Base Minmher Front VC	1.0			Viscosity @ 100°C		Aug24/23	6.0 5.0	ber	
		Ase Mirmher D	1.0			Viscosity @ 100°C		Aug24/23 +	6.0 5.0	ber	
		ase	1.0			Viscosity @ 100°C		Aug24/23 +	6.0 5.0	ber	
			1.0			Viscosity @ 100°C		Aug24/23 +	6.0 5.0	ber	
mal		1		0.0		Viscosity @ 100°C		Aug24/23	6.0 5.0	ber	
						Viscosity @ 100°C		Aug24/23	6.0 5.0 (6)HOX 6.0 Jaquing 2.0	ber	
	5	23		Aug24/i		Viscosity @ 100°C		Aug24/23	6.0 5.0 (0) HOX 4.0 bu 1.0 2.0 1.0	ber	
	a24/2	g24/2	g24/2	Au		Viscosity @ 100°C			6.0 5.0 (b)HOX bu) aquinity action 1.0 0.0	ber	
			Chock USA 501 Madican Ava Carr	Check USA 501 Madison Ave. Cary NC 3		Visc		osity @ 100°C		osity @ 100°C	osity @ 100°C
			g 2023	3	Viscosity @ 100°C	501 Madison Ave., (e., (E2H2diny Cary, NC 2	6.0 5.0 (0)НОУ ВОД 3.0 1.0 0.0 2201 27513 GFL	ber Environmental -	629 - Northern A 3947 US 131
5934Diagnosed: 22205Diagnostician: S					Laboratory Sample No. Lab Number Unique Number	Viscosity @ 100°C	501 Madison Ave Received Diagnosed	Aug24/23	6.0 5.0 (0)НОУ ВО/ 10 1.0 0.0 27513 GFL 3 3	. Environmental -	629 - Northern A 3947 US 131 Kalkaska, N US 49646-842
5934Diagnosed: 22205Diagnostician: S	an : Sean Fe	ean Felton		Contact: MITCH	Laboratory Sample No. Lab Number Unique Number Test Package	Viscosity @ 100°C	501 Madison Ave Received Diagnosed Diagnostician	e., Cary, NC 2 : 29 Aug 202: : 29 Aug 202: : Sean Felton	6.0 5.0 (0)НОУ ВО/ 10 1.0 0.0 27513 GFL 3 3	. Environmental -	629 - Northern A 3947 US 131 Kalkaska, N US 49646-842



Submitted By: Mitch Hershberger