WEAR CONTAMINATION FLUID CONDITION **NORMAL NORMAL NORMAL**



Machine Id **LIEBHERR L586 70612** Rear Left Wheel Hub

LIEBHERR GEAR BASIC 90 LS (2 LTR)

		.0.0
DECOM	MENDATION	
	MENDATION	
LICCIVII	MENDALION	

Confirm the source of the lubricant being utilized for top-up/fill.
Resample at the next service interval to monitor.

-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
١	V	۷	7		1	Δ	١	F	2																								

All component wear rates are normal.

CONTAMINATION

There is no indication of any contamination in the oil.

UID CONDITION

Additive levels indicate the addition of a different brand, or type of oil. Viscosity of sample indicates oil is within SAE 90 range, advise investigate. The condition of the oil is acceptable for the time in service.

Sample Number Client Info LH0287854 LH0269593	Test	UOM	Method	Limit/Abn	Current	History1	History2
Machine Age hrs Client Info 1998 970 Oil Age hrs Client Info 0 0 Filter Age hrs Client Info Changed Changed Filter Changed Client Info N/A N/A N/A Sample Status Vicient Info N/A N/A N/A Iron ppm ASTM D5185(m) >1625 94 153 Iron ppm ASTM D5185(m) >8 <1 2 Chromium ppm ASTM D5185(m) >4 <1 2 Nickel ppm ASTM D5185(m) >4 <1 2 Titanium ppm ASTM D5185(m) >4 <1 2 Silver ppm ASTM D5185(m) >8 <1 3 Aluminum ppm ASTM D5185(m) >10 3 7	Sample Number		Client Info		LH0287854	LH0269593	
Oil Age hrs Client Info 0 0 Filter Age hrs Client Info 0 0 Oil Changed Client Info Changed Changed Filter Changed Client Info N/A N/A N/A Sample Status NORMAL NORMAL Iron ppm ASTM D5185(m) >1625 94 153 Iron ppm ASTM D5185(m) >8 <1 2 Chromium ppm ASTM D5185(m) >8 <1 2 Nickel ppm ASTM D5185(m) >4 <1 2 Silver ppm ASTM D5185(m) >8 <1 3 Aluminum ppm ASTM D5185(m) >8 <1 3 Lead ppm ASTM D5185(m) >10 3 7 Lead ppm ASTM D5185(m) >	Sample Date		Client Info		13 Apr 2024	21 Aug 2023	
Filter Age	Machine Age	hrs	Client Info		1998	970	
Oil Changed Filter Changed Client Info Changed N/A Changed N/A Changed N/A Sample Status Client Info N/A N/A N/A Iron ppm ASTM D5185(m) >1625 94 153 Chromium ppm ASTM D5185(m) >8 <1 2 Nickel ppm ASTM D5185(m) >4 <1 2 Titanium ppm ASTM D5185(m) 0 <1 Sliver ppm ASTM D5185(m) >25 <1 2 Aluminum ppm ASTM D5185(m) >25 <1 2 Lead ppm ASTM D5185(m) >150 39 111 Copper ppm ASTM D5185(m) >10 3 7 Vanadium ppm ASTM D5185(m) >10 3 7 Valuadium ppm ASTM D5185(m)	Oil Age	hrs	Client Info		0	0	
Filter Changed Client Info N/A NORMAL NORMAL	Filter Age	hrs	Client Info		0	0	
Sample Status	Oil Changed		Client Info		Changed	Changed	
Iron	Filter Changed		Client Info		N/A	N/A	
Nickel	Sample Status				NORMAL	NORMAL	
Nickel	- Lucius		AOTM D5405()	4005	0.4	450	
Nickel	-		(/		-		
Titanium			()				
Silver			, ,	>4	·		
Aluminum			()				
Lead			(/	0.5	-	-	
Copper ppm ASTM D5185(m) >150 39 111 Tin ppm ASTM D5185(m) >10 3 7 Vanadium ppm ASTM D5185(m) 0 0 White Metal scalar Visual* NONE NONE NONE Yellow Metal scalar Visual* NONE NONE LIGHT Silicon ppm ASTM D5185(m) >100 12 25 Potassium ppm ASTM D5185(m) >20 <1 <1 Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE LIGHT Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE NONE Sand/Dir scalar Visual* NORML NORML NORML N			()				
Tin ppm ASTM D5185(m) >10 3 7 Vanadium ppm ASTM D5185(m) 0 0 0 White Metal scalar Visual* NONE NONE NONE Yellow Metal scalar Visual* NONE NONE LIGHT Silicon ppm ASTM D5185(m) >20 <1 <1 Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE LIGHT Sand/Dirt scalar Visual* NONE NONE LIGHT Sand/Dirt scalar Visual* NONE NONE NONE Appearance scalar Visual* NONE NONE NONE NONE Appearance scalar Visual* NONE NONE NONE NONE Semulsified Water scalar Visual* NORML NORML NORML NORML NORML Sodium ppm ASTM D5185(m) 0 <1 3 6 Sodium ppm ASTM D5185(m) 0 0 <1 3 Manganese ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) <1 <1 3 Magnesium ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1			, ,			-	
Vanadium ppm ASTM D5185(m) 0 0 White Metal scalar Visual* NONE NONE NONE Yellow Metal scalar Visual* NONE NONE LIGHT Silicon ppm ASTM D5185(m) >100 12 25 Potassium ppm ASTM D5185(m) >20 <1 <1 Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE LIGHT Debris scalar Visual* NONE NONE NONE Sand/Dirt scalar Visual* NONE NONE NONE Appearance scalar Visual* NORML NORML NORML NORML NORML Odor scalar Visual* >0.2 NEG NEG Sodium ppm			, ,				
White Metal scalar Visual* NONE NONE LIGHT Yellow Metal scalar Visual* NONE NONE LIGHT Silicon ppm ASTM D5185(m) >100 12 25 Potassium ppm ASTM D5185(m) >20 <1 <1 Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE NEG Silt scalar Visual* NONE NONE NONE Sand/Dirt scalar Visual* NONE NONE NONE Appearance scalar Visual* NORML NORML NORML NORML Appearance scalar Visual* >0.2 NEG NEG Bodium ppm ASTM D5185(m) 0 <1 3 6 Sodium <			(/	>10	-		
Yellow Metal scalar Visual* NONE LIGHT Silicon ppm ASTM D5185(m) >100 12 25 Potassium ppm ASTM D5185(m) >20 <1 <1 Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE LIGHT Debris scalar Visual* NONE NONE NONE Sand/Dirt scalar Visual* NORML NONE NONE Appearance scalar Visual* NORML NORML NORML NORML Odor scalar Visual* >0.2 NEG NEG Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 Boron ppm ASTM D5185(m) <th></th> <th></th> <th>()</th> <th></th> <th>-</th> <th></th> <th></th>			()		-		
Silicon ppm ASTM D5185(m) >100 12 25 Potassium ppm ASTM D5185(m) >20 <1 <1 Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE LIGHT Debris scalar Visual* NONE NONE NONE Sand/Dirt scalar Visual* NORML NORML NORML NORML NORML NORML Appearance scalar Visual* NORML NORML NORML NORML Odor scalar Visual* >0.2 NEG NEG Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 6 Boron ppm ASTM D5185(m) 0 0 <1 3<	Mhita Matal	ccalar	\/icual*	NONE.	NONE	NONE	
Potassium ppm ASTM D5185(m) >20 <1					-		
Water WC Method >0.2 NEG NEG Silt scalar Visual* NONE NONE LIGHT Debris scalar Visual* NONE VLITE NONE Sand/Dirt scalar Visual* NORML NORML NORML NORML Appearance scalar Visual* NORML NORML NORML Odor scalar Visual* NORML NORML NORML Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 6 Sodium ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) <1 <1 3 Magnesium ppm<					-		
Silt scalar Visual* NONE NONE LIGHT Debris scalar Visual* NONE VLITE NONE Sand/Dirt scalar Visual* NONE NONE NONE Appearance scalar Visual* NORML NORML NORML NORML Odor scalar Visual* NORML NORML NORML Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 6 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) <1 <1 3 Magnesium ppm ASTM D5185(m) <1 <1 3 Phosphorus<	Yellow Metal	scalar	Visual*	NONE	NONE	LIGHT	
Debris scalar Visual* NONE VLITE NONE Sand/Dirt scalar Visual* NONE NONE NONE Appearance scalar Visual* NORML NORML NORML NORML Odor scalar Visual* NORML NORML NORML Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 6 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 <1 Molybdenum ppm ASTM D5185(m) 0 0 <1 Magnesium ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus <th>Yellow Metal Silicon</th> <th>scalar</th> <th>Visual* ASTM D5185(m)</th> <th>NONE >100</th> <th>NONE 12</th> <th>LIGHT 25</th> <th></th>	Yellow Metal Silicon	scalar	Visual* ASTM D5185(m)	NONE >100	NONE 12	LIGHT 25	
Sand/Dirt scalar Visual* NONE NONE NONE Appearance scalar Visual* NORML NORML NORML NORML Odor scalar Visual* NORML NORML NORML Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 <1 Malganese ppm ASTM D5185(m) 0 21 43 Magnesium ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium	scalar	Visual* ASTM D5185(m) ASTM D5185(m)	>100 >20	12 <1	LIGHT 25 <1	
Appearance scalar Visual* NORML NORML NORML NORML Odor scalar Visual* NORML NORML NORML Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 6 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 0 21 43 Magnesium ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium Water	scalar ppm ppm	Visual* ASTM D5185(m) ASTM D5185(m) WC Method	>100 >20 >0.2	NONE 12 <1 NEG	LIGHT 25 <1 NEG	
Odor scalar Visual* NORML NORML NORML Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 0 <1 3 6 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium Water Silt	ppm ppm scalar	Visual* ASTM D5185(m) ASTM D5185(m) WC Method Visual*	>100 >20 >0.2 NONE	NONE 12 <1 NEG NONE	LIGHT 25 <1 NEG LIGHT	
Emulsified Water scalar Visual* >0.2 NEG NEG Sodium ppm ASTM D5185(m) 3 6 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium Water Silt Debris	ppm ppm scalar scalar	Visual* ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual*	>100 >20 >0.2 NONE	NONE 12 <1 NEG NONE VLITE	LIGHT 25 <1 NEG LIGHT NONE	
Sodium ppm ASTM D5185(m) 3 6 Boron ppm ASTM D5185(m) 0 <1 3 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) 0 21 43 Magnesium ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt	ppm ppm scalar scalar scalar	Visual* ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual*	>100 >20 >0.2 NONE NONE	NONE 12 <1 NEG NONE VLITE NONE	25 <1 NEG LIGHT NONE NONE	
Boron ppm ASTM D5185(m) 0 <1	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance	ppm ppm scalar scalar scalar scalar	Visual* ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual*	>100 >20 >0.2 NONE NONE NONE	NONE 12 <1 NEG NONE VLITE NONE NORML	25 <1 NEG LIGHT NONE NONE NORML	
Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 <1 Manganese ppm ASTM D5185(m) 0 21 43 Magnesium ppm ASTM D5185(m) <1 <1 3 Calcium ppm ASTM D5185(m) <1 4 11 Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor	ppm ppm scalar scalar scalar scalar scalar	Visual* ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual*	>100 >20 >0.2 NONE NONE NONE NORML	NONE 12 <1 NEG NONE VLITE NONE NORML	LIGHT 25 <1 NEG LIGHT NONE NONE NORML	
Molybdenum ppm ASTM D5185(m) 0 0 <1	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water	ppm ppm scalar scalar scalar scalar scalar	Visual* ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* Visual*	>100 >20 >0.2 NONE NONE NONE NORML	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG	
Manganese ppm ASTM D5185(m) 0 21 43 Magnesium ppm ASTM D5185(m) <1	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium	ppm ppm scalar scalar scalar scalar scalar scalar scalar	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* Visual* ASTM D5185(m)	>100 >20 >0.2 NONE NONE NORML NORML >0.2	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG 3	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6	
Magnesium ppm ASTM D5185(m) <1	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron	ppm ppm scalar scalar scalar scalar scalar scalar ppm	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m)	NONE >100 >20 >0.2 NONE NONE NONE NORML NORML >0.2	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG 3 <1	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6 3	
Calcium ppm ASTM D5185(m) <1	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium	ppm ppm scalar scalar scalar scalar scalar ppm ppm	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	NONE >100 >20 >0.2 NONE NONE NONE NORML NORML >0.2	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG 3 <1	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6 3 0	
Phosphorus ppm ASTM D5185(m) 2143 2284 2369	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum	ppm ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	NONE >100 >20 >0.2 NONE NONE NONE NORML >0.2 0 0	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG 3 <1 0 0	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6 3 0 <1	
	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese	ppm ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	NONE >100 >20 >0.2 NONE NONE NONE NORML NORML 0 0 0	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG 3 <1 0 0 21	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6 3 0 <1 43	
Zinc ppm ASTM D5185(m) <1 19 32	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium	ppm ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>100 >20 >0.2 NONE NONE NORML NORML >0.2	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NORML 0 21 <1	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6 3 0 <1 43 3	
	Yellow Metal Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm ppm ppm ppm pp	ASTM D5185(m) ASTM D5185(m) WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m)	>100 >20 >0.2 NONE NONE NORML NORML >0.2	NONE 12 <1 NEG NONE VLITE NONE NORML NORML NEG 3 <1 0 0 21 <1 4	LIGHT 25 <1 NEG LIGHT NONE NONE NORML NORML NEG 6 3 0 <1 43 3 11	

ASTM D5185(m) 23468

ASTM D7279(m)

ppm

Sulfur

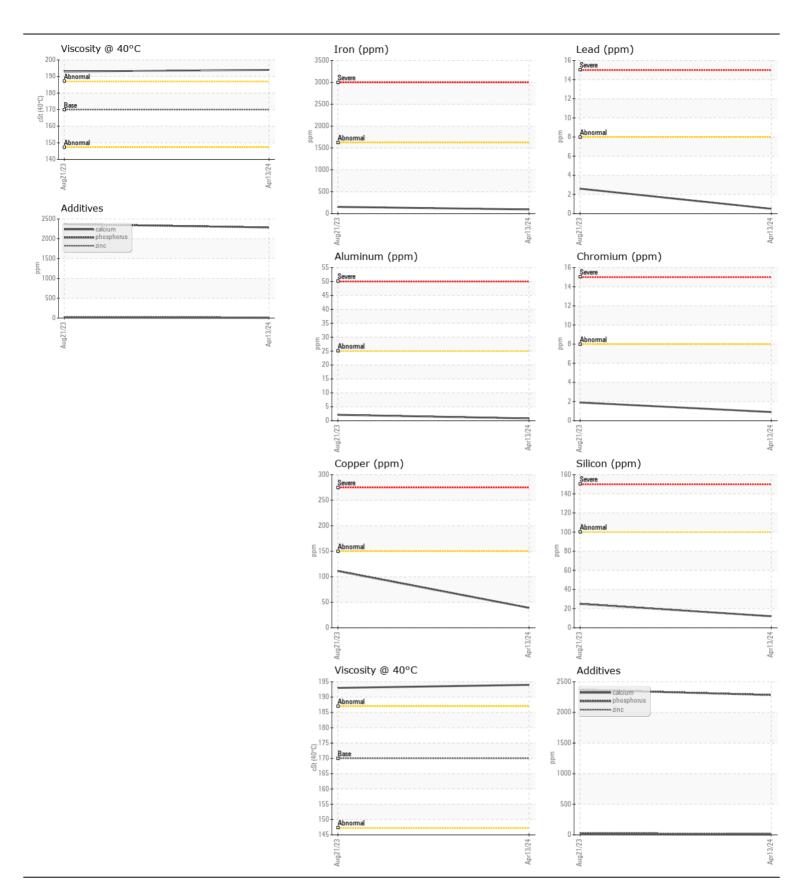
Visc @ 40°C

25494

194

26182

193 Contact/Location: Dennis Wall - GRAHAV





CALA ISO 17025:2017 Accredited Laboratory

Laboratory

Sample No.

: LH0287854 Lab Number : 02630328 Unique Number : 5763460 Test Package : MOB 1

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Received : 19 Apr 2024 **Tested** : 19 Apr 2024

Diagnosed : 22 Apr 2024 - Kevin Marson

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.

GRAYMONT (NB) INC 4634, ROUTE 880 HAVELOCK, NB **CA E4Z 5K8**

Contact: Dennis Wall

T: (506)534-6280 F: (506)534-2449