

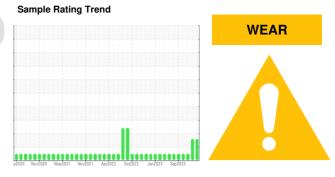
OIL ANALYSIS REPORT

(YA133453) [B Service]

3689C

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (38 QTS)



DIAGNOSIS

Recommendation

Oil and filter change at the time of sampling has been noted. No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

The chromium level is abnormal. The aluminum level is abnormal.

Contamination

There is no indication of any contamination in the

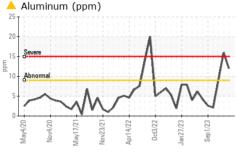
Fluid Condition

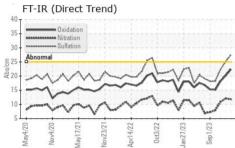
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

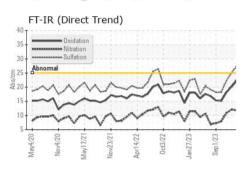
Sample Number Client Info GFL0124484 (Pack) GFL0111058 (Pack) GFL0098522 (Pack) GF							
Sample Date Client Info 08 Jul 2024 06 Mar 2024 10 Jan 2024 Machine Age hrs Client Info 20929 19762 19672 Oil Age hrs Client Info 1167 11145 808 Oil Changed Client Info Changed Changed Not Changed Sample Status Method Imitibase Current history1 history2 Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 37 45 22 Chromium ppm ASTM D5185m >4 7 A8 4 Iron ppm ASTM D5185m >2 2 2 2 1 Iron ppm ASTM D5185m >3 0 0 0 0 Iron ppm ASTM D5185m >3 1 1 1 <t< th=""><th>SAMPLE INFOR</th><th>MATION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></t<>	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 20929 19762 19672 Oil Age hrs Client Info 1167 1145 808 Oil Changed Client Info Changed Changed Not Changd Sample Status ABNORMAL ABNORMAL NORMAL CONTAMINATION method limit/base current history1 history2 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 37 45 22 Chromium ppm ASTM D5185m >50 37 45 22 Chromium ppm ASTM D5185m >2 2 2 <1	Sample Number		Client Info		GFL0124484	GFL0111058	GFL0098522
Dil Age	Sample Date		Client Info		08 Jul 2024	06 Mar 2024	10 Jan 2024
Client Info	Machine Age	hrs	Client Info		20929	19762	19672
ABNORMAL ABNORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		1167	1145	808
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ASTM D5185m >50 37 45 22 Chromium ppm ASTM D5185m >4 7 A8 8 4 Nickel ppm ASTM D5185m >2 2 2 <1	Oil Changed		Client Info			Changed	Not Changd
Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 37 45 22 Chromium ppm ASTM D5185m >4 7 & 8 4 Nickel ppm ASTM D5185m >2 2 2 2 -1 Silver ppm ASTM D5185m >3 0 0 0 0 Aluminum ppm ASTM D5185m >3 0 0 0 0 Lead ppm ASTM D5185m >3 0 2 -1 <td>Sample Status</td> <td></td> <td></td> <td></td> <th>ABNORMAL</th> <td>ABNORMAL</td> <td>NORMAL</td>	Sample Status				ABNORMAL	ABNORMAL	NORMAL
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 37 45 22 Chromium ppm ASTM D5185m >4 7 & 8 4 Nickel ppm ASTM D5185m >2 2 2 2 -1 Silver ppm ASTM D5185m >3 0 0 0 0 Aluminum ppm ASTM D5185m >3 0 0 0 0 Aluminum ppm ASTM D5185m >3 0 0 0 0 0 Aluminum ppm ASTM D5185m >9 12 4 16 9 1 -1 <th>CONTAMINAT</th> <th>ION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	CONTAMINAT	ION	method	limit/base	current	history1	history2
Iron	Water		WC Method	>0.1	NEG	NEG	NEG
Chromium ppm ASTM D5185m >4 ↑ ♠ 8 4 Nickel ppm ASTM D5185m >2 2 2 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>50	37	45	22
Titanium	Chromium	ppm	ASTM D5185m	>4	<u>^</u> 7	<u></u> 8	4
Silver ppm ASTM D5185m >3 0 0 0 Aluminum ppm ASTM D5185m >9 ▲ 12 ▲ 16 9 Lead ppm ASTM D5185m >30 2 <1 <1 Copper ppm ASTM D5185m >4 1 1 <1 Vanadium ppm ASTM D5185m >4 1 1 <1 0 Cadmium ppm ASTM D5185m <1 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 5 4 Barium ppm ASTM D5185m 50 60 54 51 Manganesium ppm ASTM D5185m 50 60 54 51 Manganesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 780	Nickel	ppm	ASTM D5185m	>2	2	2	<1
Aluminum ppm ASTM D5185m >9 ▲ 12 ▲ 16 9 Lead ppm ASTM D5185m >30 2 <1	Titanium	ppm	ASTM D5185m		<1	0	<1
Lead ppm ASTM D5185m >30 2 -1 <1 Copper ppm ASTM D5185m >35 2 <1 1 Tin ppm ASTM D5185m >4 1 1 <1 Vanadium ppm ASTM D5185m >4 1 1 <1 Cadmium ppm ASTM D5185m <-1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 5 4 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 0 0 0 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185m 50 0 0 0 ADDITIVES method 1 1 2 1 1	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper ppm ASTM D5185m >35 2 <1 1 Tin ppm ASTM D5185m >4 1 1 <1	Aluminum	ppm	ASTM D5185m	>9	<u> </u>	<u></u> 16	9
Tin	Lead	ppm	ASTM D5185m	>30	2	<1	<1
Vanadium ppm ASTM D5185m <1 <1 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 5 4 Barium ppm ASTM D5185m 50 60 54 51 Manganese ppm ASTM D5185m 50 60 54 51 Magnesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>35</td> <th>2</th> <td><1</td> <td>1</td>	Copper	ppm	ASTM D5185m	>35	2	<1	1
Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 5 4 Barium ppm ASTM D5185m 5 0 0 0 Molybdenum ppm ASTM D5185m 50 60 54 51 Manganese ppm ASTM D5185m 50 60 54 51 Magnesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 1510 1760 1556 1460 Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6	Tin	ppm	ASTM D5185m	>4	1	1	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 3 5 4 Barium ppm ASTM D5185m 50 0 0 0 Molybdenum ppm ASTM D5185m 50 60 54 51 Manganese ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 780 777 783 694 Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100	Vanadium	ppm	ASTM D5185m		<1	<1	0
Boron	Cadmium	ppm	ASTM D5185m		<1	0	0
Barium ppm ASTM D5185m 5 0 0 0 Molybdenum ppm ASTM D5185m 50 60 54 51 Manganese ppm ASTM D5185m 50 60 54 51 Magnesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 750 1760 1556 1460 Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 50 60 54 51 Manganese ppm ASTM D5185m 50 60 54 51 Magnesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 77 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m 0 0 0 0	Boron	ppm	ASTM D5185m	50	3	5	4
Manganese ppm ASTM D5185m 0 1 2 <1 Magnesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 1510 1760 1556 1460 Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0	Barium	ppm	ASTM D5185m	5	0	0	0
Magnesium ppm ASTM D5185m 560 600 566 502 Calcium ppm ASTM D5185m 1510 1760 1556 1460 Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7414	Molybdenum	ppm	ASTM D5185m	50	60		51
Calcium ppm ASTM D5185m 1510 1760 1556 1460 Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base cur	Manganese	ppm	ASTM D5185m	0	1	2	<1
Phosphorus ppm ASTM D5185m 780 777 783 694 Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION *ASTM D7414 >25 22.4	Magnesium	ppm	ASTM D5185m	560	600	566	502
Zinc ppm ASTM D5185m 870 1018 967 883 Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25		ppm	ASTM D5185m	1510	1760	1556	1460
Sulfur ppm ASTM D5185m 2040 2533 2348 2418 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Phosphorus	ppm	ASTM D5185m	780	777	783	694
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Zinc	ppm	ASTM D5185m	870	1018	967	883
Silicon ppm ASTM D5185m >+100 6 8 6 Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Sulfur	ppm	ASTM D5185m	2040	2533	2348	2418
Sodium ppm ASTM D5185m 7 8 4 Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	CONTAMINAN	TS	method	line it /le e e e			
Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2			motriod	IIIIII/base	current	history1	history2
Potassium ppm ASTM D5185m >20 3 3 3 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Silicon	ppm					_
Soot % % *ASTM D7844 0 0.1 0 Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2			ASTM D5185m		6	8	6
Nitration Abs/cm *ASTM D7624 >20 11.8 12.1 10.9 Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Sodium	ppm	ASTM D5185m ASTM D5185m	>+100	6 7	8	6 4
Sulfation Abs/.1mm *ASTM D7415 >30 27.6 25.1 22.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Sodium Potassium	ppm	ASTM D5185m ASTM D5185m ASTM D5185m	>+100 >20	6 7 3	8 8 3	6 4 3
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Sodium Potassium INFRA-RED	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method	>+100 >20	6 7 3 current	8 8 3 history1	6 4 3 history2
Oxidation Abs/.1mm *ASTM D7414 >25 22.4 20.2 18.2	Sodium Potassium INFRA-RED Soot %	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844	>+100 >20 limit/base	6 7 3 current	8 8 3 history1 0.1	6 4 3 history2 0
	Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm % Abs/cm	ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624	>+100 >20 limit/base >20	6 7 3 current 0 11.8	8 8 3 history1 0.1 12.1	6 4 3 history2 0 10.9
Base Number (BN) mg KOH/g ASTM D2896 10.2 3.1 3.6 3.5	Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624 *ASTM D7415	>+100 >20 limit/base >20 >30	6 7 3 current 0 11.8 27.6	8 8 3 history1 0.1 12.1 25.1	6 4 3 history2 0 10.9 22.3
	Sodium Potassium INFRA-RED Soot % Nitration Sulfation FLUID DEGRAI	ppm ppm % Abs/cm Abs/.1mm	ASTM D5185m ASTM D5185m ASTM D5185m method *ASTM D7844 *ASTM D7624 *ASTM D7415 method	>+100 >20 limit/base >20 >30 limit/base	6 7 3 current 0 11.8 27.6	8 8 3 history1 0.1 12.1 25.1 history1	6 4 3 history2 0 10.9 22.3 history2

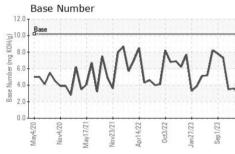


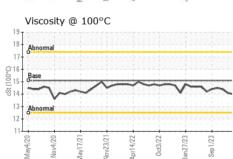
OIL ANALYSIS REPORT







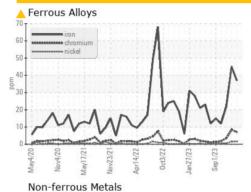


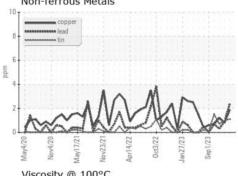


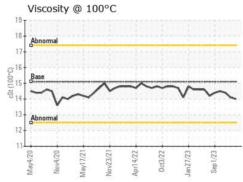
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG

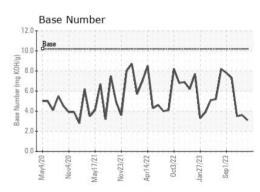
FLUID PROPI	EHIIES	method	iiiiii/base	current	riistory i	riistory
Visc @ 100°C	cSt	ASTM D445	15.1	14.0	14.1	14.4

GRAPHS













Certificate 12367

Laboratory Sample No. Lab Number : 06232148

: GFL0124484 Unique Number : 11115641 Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 10 Jul 2024 **Tested** : 11 Jul 2024 Diagnosed

: 11 Jul 2024 - Don Baldridge

GFL Environmental - 006 - Wilmington

3618 US Highway 421 N Wilmington, NC US 28401

Contact: Eric Wood eric.wood@gflenv.com T: (717)723-1956

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

Report Id: GFL006 [WUSCAR] 06232148 (Generated: 07/12/2024 11:41:25) Rev: 1

Submitted By: NEIL GIFFIN

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