

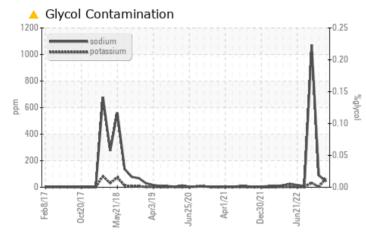
PROBLEM SUMMARY

2606C PETERBILT

Natural Gas Engine

PETRO CANADA DURON GEO LD 15W40 (48 QTS)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor.

PROBLEMATIC TEST RESULTS							
Sample Status				ABNORMAL	NORMAL	ABNORMAL	
Potassium	ppm	ASTM D5185m	>20	<u> </u>	3	A 33	

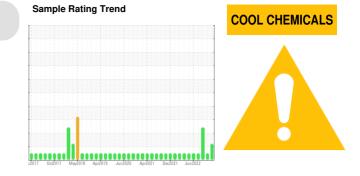
Customer Id: GFL001 Sample No.: GFL0056745 Lab Number: 05957514 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Jonathan Hester +1 919-379-4092 x4092 <u>jhester@wearcheckusa.com</u>

To change component or sample information: Customer Service +1 1-800-237-1369 <u>customerservice@wearcheck.com</u>



RECOMMENDED ACTIONS

There are no recommended actions for this sample.

HISTORICAL DIAGNOSIS

10 Apr 2023 Diag: Jonathan Hester



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

15 Aug 2022 Diag: Jonathan Hester

We advise that you check for possible coolant leak. Check for low coolant level. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition.All component wear rates are normal. Sodium and/or potassium levels are high. The BN result indicates that there is suitable alkalinity remaining in the oil.

14 Jul 2022 Diag: Don Baldridge



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



view report







OIL ANALYSIS REPORT

Sample Rating Trend

COOL CHEMICALS

2606C PETERBILT

Component Natural Gas Engine

Fluid PETRO CANADA DURON GEO LD 15W40 (48 QTS)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

Sodium and/or potassium levels are high. Test for glycol is negative.

Fluid Condition

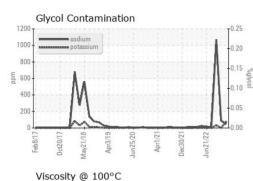
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is acceptable for the time in service.

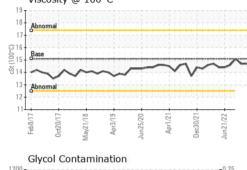
2017 0c2017 May2016 Apr2019 Jun2220 Apr2021 Dec2021 Jun2022

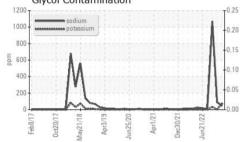
Sample NumberClient InfoGFL0056745GFL0056673GFL0056633GFL0052323Sample DateIClient Info20 Sep 202310 Apr 202315 Aug 2022Machine AgehrsClient Info226582144320423Oil AgehrsClient InfoChanged1050431Oil ChangedIClient InfoChangedChangedChangedSample StatusIClient InfoMRNDMMNORMALABNORMALWEAR METALSmethodImit/bascurrenthistory1history2IronppmASTM D5185m>2400<1ChromiumppmASTM D5185m>240<11NickelppmASTM D5185m>3024LeadppmASTM D5185m>3324LeadppmASTM D5185m>333<1AppendASTM D5185m>333<11ChandulumppmASTM D5185m>410<1AppendASTM D5185m>410<11AppendASTM D5185m>410<11AppendASTM D5185m>410<11ChromiumppmASTM D5185m5013940AppendASTM D5185m50139401ChromiumppmASTM D5185m50555388 <th>SAMPLE INFORM</th> <th>ATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Machine AgehrsClient Info226582144320423Oil AgehrsClient Info01050431Oil ChangedClient InfoABNORMALNORMALABNORMALSample StatusmethodimitoseCurrentNoRMALABNORMALWEAR METAL>methodimitoseCurrenthistory1history2IronppmASTM D5185>4411NickelppmASTM D5185>2002TitaniamppmASTM D5185>300<1	Sample Number		Client Info		GFL0056745	GFL0056653	GFL0052323
Oil Age hrs Client Info 0 1050 431 Oil Changed Client Info Changed Changed Changed Sample Status Imathod Imathod ABNORMAL NORMAL ABNORMAL WEAR METALS method Iimit/base current history1 history2 Iron ppm ASTM D5185m >50 35 15 9 Chronium ppm ASTM D5185m >50 35 15 9 Nickel ppm ASTM D5185m >20 0 <<1	Sample Date		Client Info		20 Sep 2023	10 Apr 2023	15 Aug 2022
Oil Changed Sample StatusClient InfoChanged ABNORMALChanged NORMALChanged ABNORMALWEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTM D5185m>5035159ChromiumppmASTM D5185m>2002IritaniumppmASTM D5185m>2002SilverppmASTM D5185m>3001AluminumppmASTM D5185m>3017411CopperppmASTM D5185m>3017411CopperppmASTM D5185m>3017411CadmiumppmASTM D5185m>35333-1ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m5013940BariumppmASTM D5185m50555388ManganeseppmASTM D5185m505554549CalciumppmASTM D5185m1510179416291619PhosphorusppmASTM D5185m775692813JincoppmASTM D5185m7010239631036SulfurppmASTM D5185m20703433SodiumppmASTM D5185m>20703433Sulfurppm	Machine Age	hrs	Client Info		22658	21443	20423
Sample Status Image of the status Image of the status Method Imit/base Current history1 history2 Iron ppm ASTM D5185m >50 35 15 9 Chromium ppm ASTM D5185m >4 4 1 1 Nickel ppm ASTM D5185m >2 0 0 2 Titanium ppm ASTM D5185m >2 0 0 <1	Oil Age	hrs	Client Info		0	1050	431
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >50 35 15 9 Chromium ppm ASTM D5185m >2 0 0 2 Nickel ppm ASTM D5185m >2 0 0 2 Titanium ppm ASTM D5185m >3 0 0 <1	Oil Changed		Client Info		Changed	Changed	Changed
Iron ppm ASTM D5185m >50 35 15 9 Chromium ppm ASTM D5185m >4 4 1 1 Nickel ppm ASTM D5185m >2 0 0 2 Titanium ppm ASTM D5185m >3 0 0 <1	Sample Status				ABNORMAL	NORMAL	ABNORMAL
Chromium ppm ASTM D5185m >4 4 1 1 Nickel ppm ASTM D5185m >2 0 0 2 Titanium ppm ASTM D5185m >3 0 0 <1	WEAR METALS	5	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 0 0 2 Titanium ppm ASTM D5185m >3 0 <1	Iron	ppm	ASTM D5185m	>50	35	15	9
Titanium ppm ASTM D5185m <1 0 <1 Silver ppm ASTM D5185m >3 0 0 <1	Chromium	ppm	ASTM D5185m	>4	4	1	1
Silver ppm ASTM D5185m >3 0 0 <1 Aluminum ppm ASTM D5185m >9 3 2 4 Lead ppm ASTM D5185m >30 17 4 11 Copper ppm ASTM D5185m >30 3 3 <1 Copper ppm ASTM D5185m >4 1 0 <1 Vanadium ppm ASTM D5185m >4 1 0 <1 Vanadium ppm ASTM D5185m >4 1 0 <1 0 <1 Cadmium ppm ASTM D5185m >4 1 0 <1 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 55 53 88 Magnesium ppm ASTM D5185m 50 625 540 549 Calcium ppm <t< td=""><td>Nickel</td><td>ppm</td><td>ASTM D5185m</td><td>>2</td><td>0</td><td>0</td><td>2</td></t<>	Nickel	ppm	ASTM D5185m	>2	0	0	2
Auminum ppm ASTM D5185m >9 3 2 4 Lead ppm ASTM D5185m >30 17 4 11 Copper ppm ASTM D5185m >35 3 3 <1	Titanium	ppm	ASTM D5185m		<1	0	<1
Lead ppm ASTM D5185m >30 17 4 11 Copper ppm ASTM D5185m >35 3 3 <1	Silver	ppm	ASTM D5185m	>3	0	0	<1
Copper ppm ASTM D5185m >35 3 3 <1 Tin ppm ASTM D5185m >4 1 0 <1	Aluminum	ppm	ASTM D5185m	>9	3	2	4
Tin ppm ASTM D5185m >4 1 0 <1 Vanadium ppm ASTM D5185m 0 0 <1	Lead	ppm	ASTM D5185m	>30	17	4	11
Vanadium ppm ASTM D5185m 0 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 50 55 53 88 Manganese ppm ASTM D5185m 60 625 540 549 Calcium ppm ASTM D5185m 1510 1794 1629 1619 Phosphorus ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 780 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906	Copper	ppm	ASTM D5185m	>35	3	3	<1
Cadmium ppm ASTM D5185m 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 50 0 0 2 Molybdenum ppm ASTM D5185m 50 55 53 88 Magnesium ppm ASTM D5185m 660 625 540 549 Calcium ppm ASTM D5185m 1510 1794 1629 1619 Phosphorus ppm ASTM D5185m 780 775 692 813 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Solium ppm ASTM D5185m >4100 20 <td>Tin</td> <td>ppm</td> <td>ASTM D5185m</td> <td>>4</td> <td>1</td> <td>0</td> <td><1</td>	Tin	ppm	ASTM D5185m	>4	1	0	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 50 0 0 2 Molybdenum ppm ASTM D5185m 50 55 53 88 Manganese ppm ASTM D5185m 50 625 540 549 Calcium ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 780 70 1023 963 1036 Sulfur ppm ASTM D5185m 740 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Solium ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base	Vanadium	ppm	ASTM D5185m		0	0	<1
Boron ppm ASTM D5185m 50 13 9 40 Barium ppm ASTM D5185m 5 0 0 2 Molybdenum ppm ASTM D5185m 50 55 53 88 Manganese ppm ASTM D5185m 0 2 <1 <1 Magnesium ppm ASTM D5185m 560 625 540 549 Calcium ppm ASTM D5185m 560 625 540 549 Calcium ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 870 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Solium ppm ASTM D5185m >100 20 13 21 Socium ppm ASTM D5185m >20	Cadmium	ppm	ASTM D5185m		0	0	<1
Barium ppm ASTM D5185m 5 0 0 2 Molybdenum ppm ASTM D5185m 50 55 53 88 Manganese ppm ASTM D5185m 0 2 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 50 55 53 88 Manganese ppm ASTM D5185m 0 2 <1	Boron	ppm	ASTM D5185m	50	13	9	40
Maganese ppm ASTM D5185m 0 2 <1 <1 Magnesium ppm ASTM D5185m 560 625 540 549 Calcium ppm ASTM D5185m 1510 1794 1629 1619 Phosphorus ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 870 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 12.7 Sulfation Abs/rm *ASTM D7624	Barium	ppm	ASTM D5185m	5	0	0	2
Magnesium ppm ASTM D5185m 560 625 540 549 Calcium ppm ASTM D5185m 1510 1794 1629 1619 Phosphorus ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 870 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/.1mm *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/.1mm *ASTM D7624 <t< td=""><td>Molybdenum</td><td>ppm</td><td>ASTM D5185m</td><td>50</td><td>55</td><td>53</td><td>88</td></t<>	Molybdenum	ppm	ASTM D5185m	50	55	53	88
Calcium ppm ASTM D5185m 1510 1794 1629 1619 Phosphorus ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 870 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 12.7 Sulfation Abs/1mm *ASTM D7415	Manganese	ppm	ASTM D5185m	0	2	<1	<1
Phosphorus ppm ASTM D5185m 780 775 692 813 Zinc ppm ASTM D5185m 870 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >20 45 89 1071 Potassium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/cm *ASTM D7415 >30 26.4 22.7 22.8 FLUID DEGRADATION method li	Magnesium	ppm	ASTM D5185m	560	625	540	549
Zinc ppm ASTM D5185m 870 1023 963 1036 Sulfur ppm ASTM D5185m 2040 2978 2906 2607 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m >+100 45 89 1071 Potassium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/cm *ASTM D7615 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1m *ASTM	Calcium	ppm	ASTM D5185m	1510	1794	1629	1619
SulfurppmASTM D5185m2040297829062607CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+100201321SodiumppmASTM D5185m45891071PotassiumppmASTM D5185m>20<	Phosphorus	ppm	ASTM D5185m	780	775	692	813
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>+100201321SodiumppmASTM D5185m45891071PotassiumppmASTM D5185m>2070333INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000.1NitrationAbs/cm*ASTM D7624>2011.911.312.7SulfationAbs/lmm*ASTM D7415>3026.422.722.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/lmm*ASTM D7414>2523.319.318.2	Zinc	ppm	ASTM D5185m	870	1023	963	1036
Silicon ppm ASTM D5185m >+100 20 13 21 Sodium ppm ASTM D5185m 45 89 1071 Potassium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/.1mm *ASTM D7615 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7614 >25 23.3 19.3 18.2	Sulfur	ppm	ASTM D5185m	2040	2978	2906	2607
Sodium ppm ASTM D5185m 45 89 1071 Potassium ppm ASTM D5185m >20 70 3 33 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/.1mm *ASTM D7415 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	CONTAMINANT	S	method	limit/base	current	history1	history2
PotassiumppmASTM D5185m>2070333INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844000.1NitrationAbs/cm*ASTM D7624>2011.911.312.7SulfationAbs/.1mm*ASTM D7415>3026.422.722.8FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2523.319.318.2	Silicon	ppm	ASTM D5185m	>+100	20	13	21
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/.1mm *ASTM D7415 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	Sodium	ppm	ASTM D5185m		45	89	1 071
Soot % % *ASTM D7844 0 0 0.1 Nitration Abs/cm *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/.1mm *ASTM D7415 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	Potassium	ppm	ASTM D5185m	>20	/ 70	3	A 33
Nitration Abs/cm *ASTM D7624 >20 11.9 11.3 12.7 Sulfation Abs/.1mm *ASTM D7415 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	INFRA-RED		method	limit/base	current	history1	history2
Sulfation Abs/.1mm *ASTM D7415 >30 26.4 22.7 22.8 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	Soot %	%	*ASTM D7844		0	0	0.1
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	Nitration	Abs/cm	*ASTM D7624	>20	11.9	11.3	12.7
Oxidation Abs/.1mm *ASTM D7414 >25 23.3 19.3 18.2	Sulfation	Abs/.1mm	*ASTM D7415	>30	26.4	22.7	22.8
	FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 10.2 4.0 3.1 11.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	23.3	19.3	18.2
	Base Number (BN)	mg KOH/g	ASTM D2896	10.2	4.0	3.1	11.0



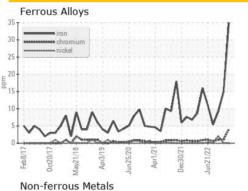
OIL ANALYSIS REPORT





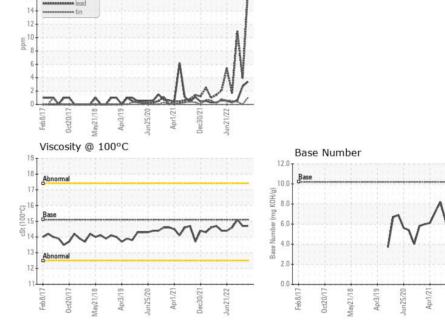


VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	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 PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.1	14.7	14.7	15.1
GRAPHS						



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: 21 Sep 2023

: 27 Sep 2023

Diagnostician : Jonathan Hester

GFL Environmental - 001 - Raleigh(CNG) 3741 Conquest Drive Garner, NC US 27529 Contact: Craig Johnson craig.johnson@gflenv.com T: (919)662-7100 106:2012) F: (919)662-7130



 Certificate 12367
 Test Package
 : FLEET (Additional Tests: Glycol)

 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)

: GFL0056745

: 05957514

: 10658727

: WearCheck USA - 501 Madison Ave., Cary, NC 27513

Received

Diagnosed

Laboratory

Sample No.

Lab Number

Unique Number

Jec30/21