



Breath Alcohol Calibration Verification Test No. 23-5691 Summary Report

Each sample pack consisted of four 34 L NIST traceable reference material dry gas cylinders which participants were requested to analyze. Data were returned from 47 participants and are compiled into the following tables:

	Page:
<u>Manufacturer's Information</u>	<u>2</u>
<u>Summary Comments</u>	<u>3</u>
<u>En Analysis Guide</u>	<u>4</u>
<u>Table 1: Reported Results</u>	<u>5</u>
<u>Graph 1: En Results</u>	<u>17</u>
<u>Table 2: Raw Data Adjustments</u>	<u>18</u>
<u>Table 3: Instrument Information</u>	<u>20</u>
<u>Table 4: Additional Comments</u>	<u>22</u>
<u>Appendix: Data Sheet</u>	
<u>Certificates of Analysis</u>	

This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

Manufacturer's Information

Each sample pack consisted of four 34 L NIST traceable reference material dry gas cylinders (Items 1-4). Participants were requested to analyze the contents of each cylinder and report the apparent breath alcohol concentration and their uncertainty.

SAMPLE PREPARATION: Cylinders were sourced from a specialty gas material vendor. The Certificate of Analysis for each lot of dry gas cylinders was compared to the requested breath alcohol concentration. Once confirmed, each cylinder within a lot was labeled with the appropriate item number.

SAMPLE PACK ASSEMBLY: Each sample pack was assembled with an Item 1, 2, 3 and 4 in a pre-labeled sample pack box.

<u>Item</u>	<u>Breath Alcohol Concentration</u> <u>(g/210L)</u>	<u>Manufacturer's Uncertainty</u> <u>(g/210L)</u>
1	0.050	± 0.0020
2	0.110	± 0.0020
3	0.280	± 0.0056
4	0.180	± 0.0036

Summary Comments

This test was designed to allow participants to assess their proficiency in the last calibration performed on their breath alcohol instrument. Each participant was supplied with a sample pack consisting of four 34L NIST traceable reference material dry gas cylinders which contained different breath alcohol concentration (BrAC) values. (Refer to Manufacturer's Information for production details.)

En analysis was performed on reported results for each item. En is not calculated for labs who did not report their expanded uncertainty. Participants with extreme data (En absolute values greater than 1.00) have been marked with an "X". Please refer to the En Analysis Guide for more information on this statistical analysis. A total of 47 participants reported results; however, not all participants reported an expanded uncertainty for every item. The percentage of participants reporting their expanded uncertainty for each item was 68%. A breakdown of the number of participants reporting extreme data per item based on En analysis is as follows: zero for Item 1, zero for Item 2, and one for Item 3, and one for Item 4. Participants are advised to consider their reported expanded uncertainty when evaluating their En results. CTS uses a coverage factor equal to 2 for analysis. At this time, the linearity of the results for each participant will not be analyzed utilizing regression statistics.

CTS noted many participants reported their instrument's serial numbers. For the sake of anonymity, CTS did not reproduce this information in the report.

En Analysis Guide

Normalized Error, or E_n , is used in proficiency testing in many other industries to judge the quality of measurement results. It measures the relationship of a participant's value to the reference value, relative to the combined uncertainties of those values. E_n is calculated as follows:

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

Where the assigned value, X_{ref} , is determined in the manufacturer's reference laboratory, U_{ref} is the expanded uncertainty of X_{ref} , and U_{lab} is the Expanded Uncertainty of a participant's result, X_{lab} . E_n is not calculated for participants who did not report their Expanded Uncertainty.

Absolute values of E_n less than **1.00** should be obtained for the measurements to be acceptable. This is because there is a 95% probability that the calculated E_n will fall within an absolute value of 1.00. Any absolute values over 1.00 have been highlighted with an "X".

The following table and graph represent the results reported by participants.

X_{ref} and U_{ref} were determined by the dry gas cylinder manufacturer, which is ISO 17025 accredited.

Reported Results

As a verification of calibration, report the ethanol concentration of each cylinder and the uncertainty determined during the last calibration of the instrument.

TABLE 1 - Item 1

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 1 Manufacturer's Concentration: 0.050 g/210L

Item 1 Manufacturer's Uncertainty: 0.0020 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
24NNUA	IR	0.053	0.0030	1011	0.83
2DZFQY	IR	0.049		999 hPas	†
4DRKRC	EC	0.049		1003 hPa	†
	IR	0.050		1003 hPa	†
67QLZM	IR	0.051	0.0020	1010.9	0.35
6F8CFJ	Fuel Cell	0.047		760	†
6QV47H	Thermo electrically cooled lead selenide infrared	0.050		1010 mbar	†
8JKPFW	IR	0.048	0.0030	914 mb	-0.55
9ABLN6	fuel cell	0.050	0.0030	749	0.00
9DVR4E	EC/IR	0.050	0.0050	746 mmHg	0.00
A3BK6P	Fuel cell	0.051	0.0020	864	0.35
A7T2ZF	Fuel Cell	0.052	0.0020	923	0.71
ADU2R6	IR	0.050	0.0030	1016.4 mBar	0.00
AYN8X8	EC	0.053	0.0070	1003	0.41
	IR	0.052	0.0060	1003	0.32
BBZPDG	Infrared	0.051			†
BDN2CM	IR	0.049	0.0100	1007	-0.10

TABLE 1 - Item 1

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 1 Manufacturer's Concentration: 0.050 g/210L

Item 1 Manufacturer's Uncertainty: 0.0020 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
BZYAJ7	EC	0.048	0.0060	977	-0.32
	IR	0.048	0.0060	977	-0.32
C3JFG9	IR	0.051	0.0060	761 mmHg	0.16
C8EAEA	IR	0.050	0.0050	948	0.00
DLRZT2	IR	0.049	0.0030	1013.4 mBar	-0.28
EEQ22C	Lifeloc FC-20BT	0.050	0.0020	936: 936, 935 938: 939, 937	0.00
EPPVXM	Infrared	0.049	0.0050	855.4 hPa	-0.19
EX3UK7	Fuel Cell	0.050	0.0040	743 mmHg	0.00
FKRYML	IR	0.048	0.0050	853	-0.37
G2T7D9	Thermo electrically cooled lead selenide infrared	0.050		1007 mbar	†
GCUL3D	Electrochemical Sensor (Fuel Cell)	0.052	0.0050	997.0	0.37
GDMKD6	Thermo Electrically Cooled Lead Selenide Infrared	0.050		1009 mbar	†
GPHNK6	Fuel Cell	0.049	0.0030	N/A (on board barometer)	-0.28
JED6EU	Fuel Cell	0.049	0.0030	756 mmHg	-0.28
LANRB9	IR (Infrared)	0.050	0.0020	989.175	0.00
LJXZD4	electrochemical (EC) fuel cell	0.049	0.0050	739 mm Hg	-0.19
LUGDCZ	Thermo electrically cooled lead selenide infrared	0.050		1007 mbar	†

TABLE 1 - Item 1

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 1 Manufacturer's Concentration: 0.050 g/210L

Item 1 Manufacturer's Uncertainty: 0.0020 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
M327WV	Infrared	0.052	0.0041	1001.5 mbar	0.44
MHHX4A	IR	0.050		1001 hPas	†
MTHPAF	IR, Pyro-Electric Detector	0.050		Instrument: 999.0 hPa, Druck Pressure Monitor: 999.9 hPa	†
N2REPZ	Fuel Cell	0.049	0.0050	749mmHg	-0.19
NEDURD	IR	0.049	0.0050	850 hPa	-0.19
NK3DN3	Electrochemical fuel cell	0.049	0.0030	756	-0.28
P7FG76	Fuel Cell	0.048	0.0050	752.5	-0.37
QLNWNQ	Thermo electrically cooled lead selenide infrared	0.050		1008 mbar	†
QUH3HR	IR	0.051		972	†
R7TWBW	Thermo electrically cooled lead selenide infrared.	0.050		1011 mbar	†
RVRB4X	3.4 and 9.4um, dual-wavelength pyroelectric detectors.	0.048	0.0036	851 hPa	-0.49
RW6XLC	IR	0.052		923	†
TN8NTR	Fuel Cell	0.048	0.0030	N/A - measured by on board barometer	-0.55
WBRUQQ	Electrochemical Fuel Cell	0.051	0.0050	748 mm Hg	0.19
XP4WLJ	IR	0.050	0.0040	29.50	0.00
ZAYD2X	IR	0.049		996 hPas	†

TABLE 1 - Item 2

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 2 Manufacturer's Concentration: 0.110 g/210L

Item 2 Manufacturer's Uncertainty: 0.0020 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
24NNUA	IR	0.113	0.0030	1011	0.83
2DZFQY	IR	0.110		999 hPas	†
4DRKRC	EC	0.109		1003 hPa	†
	IR	0.110		1003 hPa	†
67QLZM	IR	0.112	0.0050	1010.9	0.37
6F8CFJ	Fuel Cell	0.103		760	†
6QV47H	Thermo electrically cooled lead selenide infrared	0.109		1010 mbar	†
8JKPFW	IR	0.108	0.0040	914 mb	-0.45
9ABLN6	fuel cell	0.110	0.0060	749	0.00
9DVR4E	EC/IR	0.110	0.0050	746 mmHg	0.00
A3BK6P	Fuel cell	0.109	0.0020	864	-0.35
A7T2ZF	Fuel Cell	0.112	0.0020	923	0.71
ADU2R6	IR	0.108	0.0050	1016.4 mBar	-0.37
AYN8X8	EC	0.116	0.0100	1003	0.59
	IR	0.115	0.0100	1003	0.49
BBZPDG	Infrared	0.109			†
BDN2CM	IR	0.108	0.0100	1007	-0.20
BZYAJ7	EC	0.106	0.0090	977	-0.43
	IR	0.109	0.0090	977	-0.11
C3JFG9	IR	0.109	0.0110	761 mmHg	-0.09
C8EAEA	IR	0.110	0.0060	948	0.00
DLRZT2	IR	0.110	0.0040	1013.4 mBar	0.00

TABLE 1 - Item 2

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore E_n could not be calculated.

Item 2 Manufacturer's Concentration: 0.110 g/210L

Item 2 Manufacturer's Uncertainty: 0.0020 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in E _n)	Performance Statistic (E _n)
EEQ22C	Lifeloc FC-20BT	0.111	0.0020	936: 936, 935 938: 939, 937	0.35
EPPVXM	Infrared	0.108	0.0050	855.4 hPa	-0.37
EX3UK7	Fuel Cell	0.111	0.0060	743 mmHg	0.16
FKRYML	IR	0.109	0.0050	853	-0.19
G2T7D9	Thermo electrically cooled lead selenide infrared	0.109		1007 mbar	†
GCUL3D	Electrochemical Sensor (Fuel Cell)	0.112	0.0070	997.0	0.27
GDMKD6	Thermo Electrically Cooled Lead Selenide Infrared	0.109		1009 mbar	†
GPHNK6	Fuel Cell	0.110	0.0050	N/A (on board barometer)	0.00
JED6EU	Fuel Cell	0.108	0.0060	756 mmHg	-0.32
LANRB9	IR (Infrared)	0.110	0.0030	989.175	0.00
LXZD4	electrochemical (EC) fuel cell	0.110	0.0050	739 mm Hg	0.00
LUGDCZ	Thermo electrically cooled lead selenide infrared	0.109		1007 mbar	†
M327WV	Infrared	0.112	0.0041	1001.5 mbar	0.44
MHHX4A	IR	0.111		1001 hPas	†
MTHPAF	IR, Pyro-Electric Detector	0.110		Instrument: 999.0 hPa, Druck Pressure Monitor: 999.9 hPa	†
N2REPZ	Fuel Cell	0.109	0.0050	749mmHg	-0.19
NEDURD	IR	0.107	0.0050	850 hPa	-0.56
NK3DN3	Electrochemical fuel cell	0.109	0.0080	756	-0.12
P7FG76	Fuel Cell	0.108	0.0050	752.5	-0.37

TABLE 1 - Item 2

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 2 Manufacturer's Concentration: 0.110 g/210L

Item 2 Manufacturer's Uncertainty: 0.0020 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
QLNWNQ	Thermo electrically cooled lead selenide infrared	0.109		1008 mbar	†
QUH3HR	IR	0.110		972	†
R7TWBW	Thermo electrically cooled lead selenide infrared.	0.109		1011 mbar	†
RVRB4X	3.4 and 9.4µm, dual-wavelength pyroelectric detectors.	0.106	0.0360	851 hPa	-0.11
RW6XLC	IR	0.112		923	†
TN8NTR	Fuel Cell	0.107	0.0050	N/A - measured by on board barometer	-0.56
WBRUQQ	Electrochemical Fuel Cell	0.113	0.0050	748 mm Hg	0.56
XP4WLJ	IR	0.110	0.0050	29.50	0.00
ZAYD2X	IR	0.111		996 hPas	†

TABLE 1 - Item 3

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 3 Manufacturer's Concentration: 0.280 g/210L

Item 3 Manufacturer's Uncertainty: 0.0056 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
24NNUA	IR	0.283	0.0030	1011	0.47
2DZFQY	IR	0.283		999 hPas	†
4DRKRC	EC	0.271		1003 hPa	†
	IR	0.275		1003 hPa	†
67QLZM	IR	0.286	0.0140	1010.9	0.40
6F8CFJ	Fuel Cell	0.266		760	†
6QV47H	Thermo electrically cooled lead selenide infrared	0.276		1010 mbar	†
8JKPFW	IR	0.278	0.0060	914 mb	-0.24
9ABLN6	fuel cell	0.279	0.0060	749	-0.12
9DVR4E	EC/IR	0.280	0.0130	746 mmHg	0.00
A3BK6P	Fuel cell	0.273	0.0040	864	-1.02 X
A7T2ZF	Fuel Cell	0.280	0.0040	923	0.00
ADU2R6	IR	0.271	0.0180	1016.4 mBar	-0.48
AYN8X8	EC	0.295	0.0210	1003	0.69
	IR	0.296	0.0200	1003	0.77
BBZPDG	Infrared	0.280			†
BDN2CM	IR	0.276	0.0100	1007	-0.35
BZYAJ7	EC	0.273	0.0190	977	-0.35
	IR	0.279	0.0200	977	-0.05

TABLE 1 - Item 3

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 3 Manufacturer's Concentration: 0.280 g/210L

Item 3 Manufacturer's Uncertainty: 0.0056 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
C3JFG9	IR	0.279	0.0150	761 mmHg	-0.06
C8EAEA	IR	0.281	0.0140	948	0.07
DLRZT2	IR	0.281	0.0070	1013.4 mBar	0.11
EEQ22C	Lifeloc FC-20BT	0.278	0.0040	936: 936, 935 938: 939, 937	-0.29
EPPVXM	Infrared	0.277	0.0110	855.4 hPa	-0.24
EX3UK7	Fuel Cell	0.280	0.0120	743 mmHg	0.00
FKRYML	IR	0.278	0.0110	853	-0.16
G2T7D9	Thermo electrically cooled lead selenide infrared	0.276		1007 mbar	†
GCUL3D	Electrochemical Sensor (Fuel Cell)	0.280	0.0240	997.0	0.00
GDMKD6	Thermo Electrically Cooled Lead Selenide Infrared	0.275		1009 mbar	†
GPHNK6	Fuel Cell	0.286	0.0080	N/A (on board barometer)	0.61
JED6EU	Fuel Cell	0.276	0.0060	756 mmHg	-0.49
LANRB9	IR (Infrared)	0.279	0.0090	989.175	-0.09
LJXZD4	electrochemical (EC) fuel cell	0.280	0.0130	739 mm Hg	0.00
LUGDCZ	Thermo electrically cooled lead selenide infrared	0.275		1007 mbar	†
M327WV	Infrared	0.278	0.0041	1001.5 mbar	-0.29
MHHX4A	IR	0.286		1001 hPas	†

TABLE 1 - Item 3

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 3 Manufacturer's Concentration: 0.280 g/210L

Item 3 Manufacturer's Uncertainty: 0.0056 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
MTHPAF	IR, Pyro-Electric Detector	0.281		Instrument: 999.0 hPa, Druck Pressure Monitor: 999.9 hPa	†
N2REPZ	Fuel Cell	0.269	0.0120	749mmHg	-0.83
NEDURD	IR	0.276	0.0110	850 hPa	-0.32
NK3DN3	Electrochemical fuel cell	0.279	0.0130	756	-0.07
P7FG76	Fuel Cell	0.280	0.0140	752.5	0.00
QLNWNQ	Thermo electrically cooled lead selenide infrared	0.275		1008 mbar	†
QUH3HR	IR	0.280		972	†
R7TWBW	Thermo electrically cooled lead selenide infrared.	0.275		1011 mbar	†
RVRB4X	3.4 and 9.4um, dual-wavelength pyroelectric detectors.	0.273	0.0360	851 hPa	-0.19
RW6XLC	IR	0.280		923	†
TN8NTR	Fuel Cell	0.275	0.0090	N/A - measured by on board barometer	-0.47
WBRUQQ	Electrochemical Fuel Cell	0.285	0.0130	748 mm Hg	0.35
XP4WLJ	IR	0.276	0.0110	29.50	-0.32
ZAYD2X	IR	0.284		996 hPas	†

TABLE 1 - Item 4

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 4 Manufacturer's Concentration: 0.180 g/210L

Item 4 Manufacturer's Uncertainty: 0.0036 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
24NNUA	IR	0.185	0.0030	1011	1.07 X
2DZFQY	IR	0.182		999 hPas	†
4DRKRC	EC	0.176		1003 hPa	†
	IR	0.179		1003 hPa	†
67QLZM	IR	0.183	0.0090	1010.9	0.31
6F8CFJ	Fuel Cell	0.174		760	†
6QV47H	Thermo electrically cooled lead selenide infrared	0.178		1010 mbar	†
8JKPFW	IR	0.179	0.0040	914 mb	-0.19
9ABLN6	fuel cell	0.179	0.0060	749	-0.14
9DVR4E	EC/IR	0.180	0.0080	746 mmHg	0.00
A3BK6P	Fuel cell	0.181	0.0040	864	0.19
A7T2ZF	Fuel Cell	0.183	0.0040	923	0.56
ADU2R6	IR	0.175	0.0180	1016.4 mBar	-0.27
AYN8X8	EC	0.190	0.0140	1003	0.69
	IR	0.190	0.0140	1003	0.69
BBZPDG	Infrared	0.181			†
BDN2CM	IR	0.178	0.0100	1007	-0.19
BZYAJ7	EC	0.173	0.0130	977	-0.52
	IR	0.180	0.0140	977	0.00
C3JFG9	IR	0.180	0.0150	761 mmHg	0.00

TABLE 1 - Item 4

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 4 Manufacturer's Concentration: 0.180 g/210L

Item 4 Manufacturer's Uncertainty: 0.0036 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
C8EAEA	IR	0.180	0.0090	948	0.00
DLRZT2	IR	0.180	0.0070	1013.4 mBar	0.00
EEQ22C	Lifeloc FC-20BT	0.179	0.0040	936: 936, 935 938: 939, 937	-0.19
EPPVXM	Infrared	0.177	0.0070	855.4 hPa	-0.38
EX3UK7	Fuel Cell	0.180	0.0060	743 mmHg	0.00
FKRYML	IR	0.179	0.0070	853	-0.13
G2T7D9	Thermo electrically cooled lead selenide infrared	0.177		1007 mbar	†
GCUL3D	Electrochemical Sensor (Fuel Cell)	0.180	0.0110	997.0	0.00
GDMKD6	Thermo Electrically Cooled Lead Selenide Infrared	0.177		1009 mbar	†
GPHNK6	Fuel Cell	0.182	0.0050	N/A (on board barometer)	0.32
JED6EU	Fuel Cell	0.178	0.0060	756 mmHg	-0.29
LANRB9	IR (Infrared)	0.180	0.0050	989.175	0.00
LJXZD4	electrochemical (EC) fuel cell	0.179	0.0080	739 mm Hg	-0.11
LUGDCZ	Thermo electrically cooled lead selenide infrared	0.178		1007 mbar	†
M327WV	Infrared	0.183	0.0041	1001.5 mbar	0.55
MHHX4A	IR	0.184		1001 hPas	†

TABLE 1 - Item 4

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

X_{lab}: Participant's concentration
 X_{ref}: Manufacturer's concentration
 U_{lab}: Participant's uncertainty
 U_{ref}: Manufacturer's uncertainty

† Uncertainty not reported or reported in units other than g/210L, therefore En could not be calculated.

Item 4 Manufacturer's Concentration: 0.180 g/210L

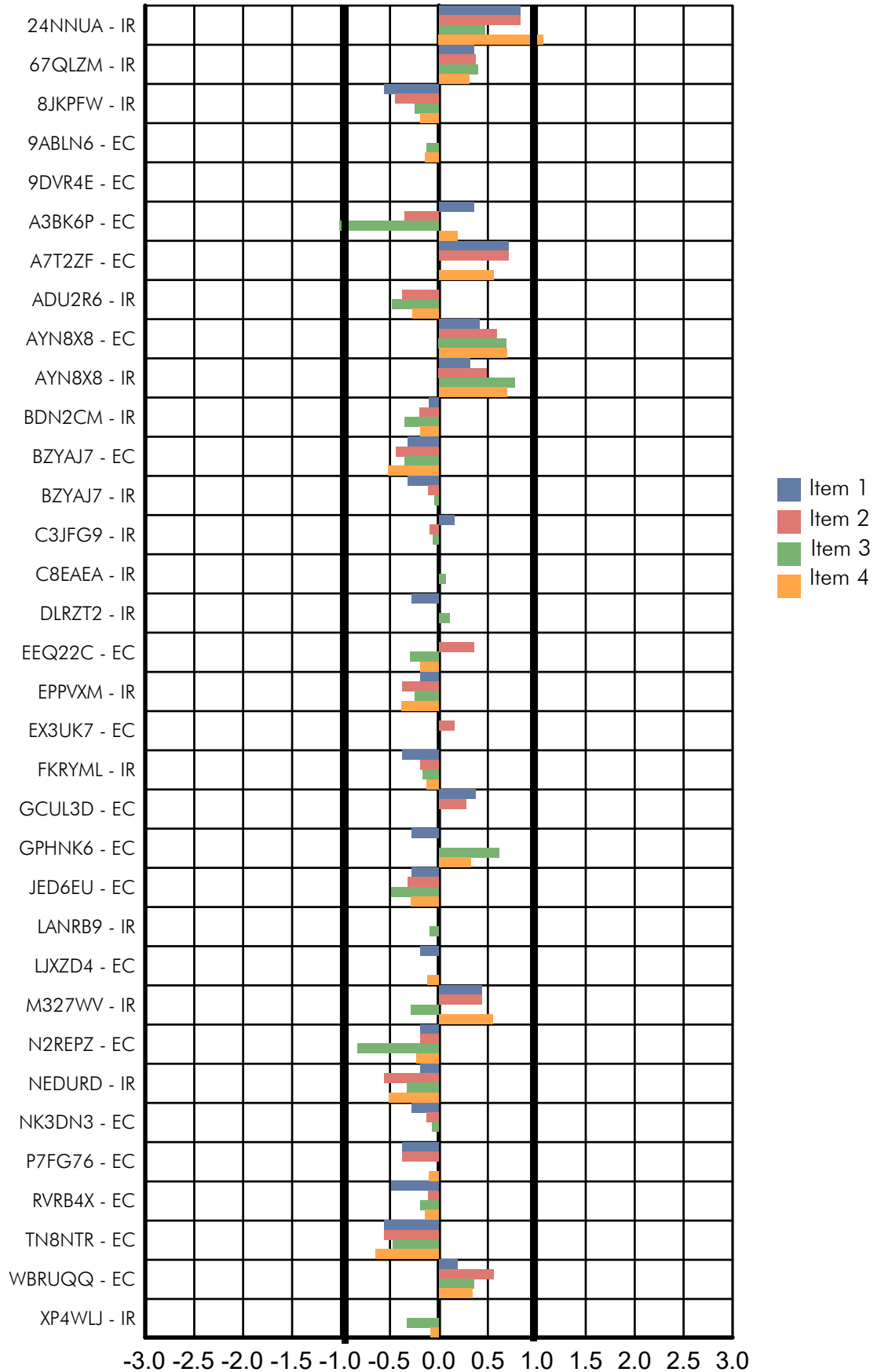
Item 4 Manufacturer's Uncertainty: 0.0036 g/210L

WebCode	Detector Type	Concentration (g/210L)	Uncertainty k=2 (g/210L)	Barometric Pressure (not used in En)	Performance Statistic (En)
MTHPAF	IR, Pyro-Electric Detector	0.181		Instrument: 999.0 hPa, Druck Pressure Monitor: 999.9 hPa	†
N2REPZ	Fuel Cell	0.178	0.0080	749mmHg	-0.23
NEDURD	IR	0.176	0.0070	850 hPa	-0.51
NK3DN3	Electrochemical fuel cell	0.180	0.0080	756	0.00
P7FG76	Fuel Cell	0.179	0.0090	752.5	-0.10
QLNWNQ	Thermo electrically cooled lead selenide infrared	0.178		1008 mbar	†
QUH3HR	IR	0.180		972	†
R7TWBW	Thermo electrically cooled lead selenide infrared.	0.178		1011 mbar	†
RVRB4X	3.4 and 9.4um, dual-wavelength pyroelectric detectors.	0.175	0.0360	851 hPa	-0.14
RW6XLC	IR	0.182		923	†
TN8NTR	Fuel Cell	0.176	0.0050	N/A - measured by on board barometer	-0.65
WBRUQQ	Electrochemical Fuel Cell	0.183	0.0080	748 mm Hg	0.34
XP4WLJ	IR	0.179	0.0110	29.50	-0.09
ZAYD2X	IR	0.184		996 hPas	†

En Results

WebCode - Detector

Graph 1



Raw Data Adjustments

TABLE 2

List the type and amount of any adjustments made on the raw data to produce the reported concentration, such as for barometric pressure, the wet/dry offset, etc.

WebCode	Raw Data Adjustments
24NNUA	A stability test was used to acquire the data. To stay consistent with [State] policies the lower of the two values was reported.
67QLZM	Reported value is the mean of 3 replicates truncated to the third decimal place.
6F8CFJ	All data was adjusted from the actual barometric pressure to 760 mmHg. Actual pressures: Item 1: 738 mmHg, Item 2: 741 mmHg, Item 3: 742 mmHg, Item 4: 735 mmHg. Corrected dry gas tanks are used for calibration; no additional correction was made for wet/dry offset.
6QV47H	Barometric pressure. The Datamaster DMT is equipped with a barometric sensor. The target value is adjusted based on the site specific reading of barometric pressure.
8JKPFW	Barometric correction factor 1.10.
9ABLN6	Raw data adjusted for wet/dry offset (+4.5%) and normalized to sea level (760/xxx*760mmHg)
9DVR4E	Mean result x (760/pressure reading) x 1.045
A3BK6P	Used Lifeloc EasyCal for dry gas dispensing and barometric pressure readings. Wet/dry offset of Lifeloc FC20BT is 1.050. Samples ran in triplicate and average value given for each.
A7T2ZF	I used the EasyCal dry gas delivery system connected to the Lifeloc FC-20BT. The EasyCal has dual barometers and adjusts for barometric pressure automatically. The Lifeloc has a dry gas correction factor set to 1.050. The reported concentration was an average of multiple samples that was rounded down.
ADU2R6	No adjustments from original Intoxilyzer 8000 data
BBZPDG	NA
BDN2CM	NONE, CF=0
C3JFG9	N/A
C8EAEA	NA
DLRZT2	No adjustments were made
EEQ22C	Testing was performed in triplicate and average was rounded down. The instrument has a wet/dry offset of 1.050 (5%).
EPPVXM	Barometric pressure adjustment and wet/dry offset calculations are made by the instrument to yield the reported result. No operator calculations are performed.
EX3UK7	+4% dry gas correction, barometric pressure correction (760 mmHg/Lab Pressure mmHg)
FKRYML	None
G2T7D9	Barometric pressure. The DataMaster DMT is equipped with a barometric sensor. The target value is adjusted based on the site-specific reading of barometric pressure.

TABLE 2

WebCode	Raw Data Adjustments
GCUL3D	An adjustment was not performed because the instrument has a built-in pressure transducer. The pressure transducer automatically corrects for the altitude and applies the dry/wet offset for the selected dry gas standard.
GDMKD6	Barometric pressure. The DataMaster DMT is equipped with a barometric sensor. The target value is adjusted based on the site-specific reading of barometric pressure.
GPHNK6	+4.5% dry gas offset. Onboard thermometer and barometer.
JED6EU	Raw data adjusted for wet/dry offset(+4.5%) and normalized to sea level (760/xxx*760mmHg)
LANRB9	IR Measurements were normalized to sea level equivalent = analyzed value/barometric pressure * 1013
LJXZD4	Value adjusted for wet/dry offset and normalized for pressure using the mean value of two replicates x (760/pressure) x 1.045.
LUGDCZ	Barometric pressure. The DataMaster DMT is equipped with a barometric sensor. The target value is adjusted based on the site-specific reading of barometric pressure.
M327WV	No adjustments were made to the raw data to produce the reported concentration.
MHHX4A	N/A
MTHPAF	N/A
N2REPZ	The following calculation was used to normalize for barometric pressure and the wet/dry offset: (mean instrument value in g/210L) x (760/ barometric pressure reading) x 1.045= value normalized.
NK3DN3	The raw data is normalized to 760 mmHg and corrected with a factor of 4.5% to account for the wet/dry offset.
P7FG76	All adjustments on the raw data to produce the reported concentrations were programmed in the instrument's software.
QLNWNQ	Barometric pressure. The DataMaster DMT is equipped with a barometric sensor. The target value is adjusted based on the site specific reading of barometric pressure.
R7TWBW	Barometric pressure. The DataMaster DMT is equipped with a barometric sensor. The target value is adjusted based on the site specific reading of barometric pressure.
RVRB4X	N/A
RW6XLC	N/A
TN8NTR	+4.5% offset when using dry gas ethanol devices; built in barometer; built in thermometer
WBRUQQ	The mean of two raw data measurements is calculated. From this, the adjusted result is normalized for pressure and wet/dry offset. The following equation is used for this conversion: Adjusted result = mean result x (760/pressure reading) x 1.045
XP4WLJ	Values were adjusted to standard barometric pressure values.
ZAYD2X	N/A

Instrument Information

TABLE 3

WebCode	Instrument used	Detector type
24NNUA	Intox 8000 [Serial Number]	IR
2DZFQY	Draeger Alcotest 9510 / [Serial Number]	IR
4DRKRC	Draeger AlcoTest 9510	EC
	Draeger AlcoTest 9510	IR
67QLZM	Draeger Alcotest 9510	IR
6F8CFJ	Intoximeter EC/IR2	Fuel Cell
6QV47H	Datamaster DMT [Serial Number]	Thermo electrically cooled lead selenide infrared
8JKPFW	Intoxilyzer 9000	IR
9ABLN6	Intox EC/IR II	fuel cell
9DVR4E	Intoximeter ECIR II	EC/IR
A3BK6P	Lifeloc FC20BT [Serial Number]	Fuel cell
A7T2ZF	Lifeloc FC-20BT	Fuel Cell
ADU2R6	Intoxilyzer 8000	IR
AYN8X8	[Serial Number with no Instrument information provided.]	EC
	[Serial Number with no Instrument information provided.]	IR
BBZPDG	Alcotest 7110 MKIII-C [Serial Number]	Infrared
BDN2CM	INTOX 8000	IR
BZYAJ7	[Serial Number with no Instrument information provided.]	EC
	[Serial Number with no Instrument information provided.]	IR
C3JFG9	Draeger Alcotest 7110 MKIII-C	IR
C8EAEA	Intoxilyzer 8000	IR
DLRZT2	Intoxilyzer 8000	IR
EEQ22C	[Serial Number with no Instrument information provided.]	Lifeloc FC-20BT
EPPVXM	Intoxilyzer 8000	Infrared
EX3UK7	EC/IR II [Serial Number] (Intoximeters, Inc.)	Fuel Cell
FKRYML	Intoxilyzer 8000	IR
G2T7D9	DataMaster DMT [Serial Number]	Thermo electrically cooled lead selenide infrared
GCUL3D	Drager Alcotest A7510 [Serial Number]	Electrochemical Sensor (Fuel Cell)
GDMKD6	DataMaster DMT [Serial Number]	Thermo Electrically Cooled Lead Selenide Infrared
GPHNK6	ASV-XL	Fuel Cell
JED6EU	Intoximeters Intox EC/IR II	Fuel Cell

TABLE 3

WebCode	Instrument used	Detector type
LANRB9	DMT Serial Number [Serial Number]	IR (Infrared)
LXZD4	Intox EC/IR II	electrochemical (EC) fuel cell
LUGDCZ	DataMaster DMT [Serial Number]	Thermo electrically cooled lead selenide infrared
M327WV	Intoxilyzer 9000	Infrared
MHHX4A	Draeger Alcotest 9510 [Serial Number]	IR
MTHPAF	Intoxilyzer 9000	IR, Pyro-Electric Detector
N2REPZ	Intoximeter Intox EC/IR II	Fuel Cell
NEDURD	Intoxilyzer 8000	IR
NK3DN3	Intoximeter EC/IR II	Electrochemical fuel cell
P7FG76	ASV-XL	Fuel Cell
QLNWNQ	DataMaster DMT [Serial Number]	Thermo electrically cooled lead selenide infrared
QUH3HR	CMI Intoxilyzer 9000 [Serial Number]	IR
R7TWBW	DataMaster DMT [Serial Number]	Thermo electrically cooled lead selenide infrared.
RVRB4X	[Serial Number] (IR-8000)	3.4 and 9.4um, dual-wavelength pyroelectric detectors.
RW6XLC	Intoxilyzer 8000	IR
TN8NTR	AlcoSensor VXL	Fuel Cell
WBRUQQ	Intoximeters Intox EC/IR II	Electrochemical Fuel Cell
XP4WLJ	DataMaster DMT	IR
ZAYD2X	Alcotest 9510 [Serial Number]	IR

Additional Comments

TABLE 4

WebCode	Additional Comments
4DRKRC	This laboratory has not calculated measurement uncertainty for breath alcohol calibration.
6F8CFJ	Measurement uncertainty is calculated for calibration purposes only at three concentrations (per our Testing Method, 0.020 g/210L, 0.082 g/210L, and 0.150 g/210L).
6QV47H	Each item was analyzed three times. The average value of the three analyses for each item was reported to three decimal places (reported concentration). The laboratory only calculates expanded uncertainty for the calibration of the instrument, applying it to calibration measurements during the certification process. Uncertainty is not calculated for the verification of calibration, and hence not reported for the items.
9DVR4E	1.045 is for the wet/dry offset. The UM at a k=2 is +/- 4.6% or +/- 0.005 whichever range is greater.
BBZPDG	[From Table 1 - Reported Results, Items 1-4: The uncertainty value of 0.000 was removed from Items 1 - 4 because our statistical analysis program is unable to calculate En using this value.]
EEQ22C	The testing was performed over two days. The pipe symbol separates the two days; the first set of data is for 8/3/2023, and the second set is for 8/4/2023. The first value being from a NIST certified Barometer and the other two values coming from the barometers within the gas delivery system (Lifeloc EasyCal)
G2T7D9	Each item was analyzed three times. The average value of the three analyses for each item was reported to three decimal places (reported concentration). The laboratory only calculates expanded uncertainty for the calibration of the instrument, applying it to calibration measurements during the certification process. Uncertainty is not calculated for the verification of calibration, and hence not reported for the items.
GDMKD6	Each item was analyzed three times. The average value of the three analyses for each item was reported to three decimal places (reported concentration). The laboratory only calculates expanded uncertainty for the calibration of the instrument, applying it to calibration measurements during the certification process. Uncertainty is not calculated for the verification of calibration, and hence not reported for the items.
LXZD4	UM k=2 is 0.005 or 4.6% of the nominal value, whichever is greater.
LUGDCZ	Each Item was analyzed three times. The average value of the three analyses for each item was reported to three decimal places (reported concentration). The laboratory only calculates expanded uncertainty for the calibration of the instrument, applying it to calibration measurements during the certification process. Uncertainty is not calculated for the verification of calibration, and hence not reported for items.
MTHPAF	Our uncertainty is built on historical data from the calibration of all the instruments in service. We do not figure the uncertainty on the individual samples but on each of the four different reference materials used during calibrations: 0.050 +/- 0.004 g/210L, 0.100 +/- 0.004 g/210L, 0.200 +/- 0.006 g/210L, 0.300 +/- 0.010 g/210L. With that said, I cannot assign an uncertainty to the reported concentrations.
N2REPZ	The uncertainty of measurement used is 4.6% or 0.005, whichever is greater, with a coverage factor of k=2; corresponding to a ~95% level of confidence.

TABLE 4

WebCode	Additional Comments
NK3DN3	Laboratory certificate of instrument accuracy is issued with an expanded uncertainty using a coverage factor of $K=3$. The uncertainty of measurement is calculated for the certification process. Four concentrations of dry gas standards are used to certify the instrument accuracy and the uncertainty of measurement is calculated for these concentrations. The uncertainty provided with reported concentration was determined using a coverage factor of $K=2$
QLNWNQ	Each item was analyzed three times. The average value of the three analyses for each item was reported to three decimal places (reported concentration). The laboratory only calculates expanded uncertainty for the calibration of the instrument, applying it to calibration measurements during the certification process. Uncertainty is not calculated for the verification of calibration, and hence not reported for the items.
R7TWBW	Each item was analyzed three times. The average value of the three analyses for each item was reported to three decimal places (reported concentration). The laboratory only calculates expanded uncertainty for the calibration of the instrument, applying it to calibration measurements during the certification process. Uncertainty is not calculated for the verification of calibration, and hence not reported for the items.
RVRB4X	[From Table 1 - Reported Results, Items 2-4: The reported uncertainty values of 3.6% were converted to decimal form to allow for calculation of E_n .]
RW6XLC	Measurement uncertainty is only reported on calibrators; it is not reported on unknown concentrations.
WBRUQQ	The estimated uncertainty of measurement at $k=2$ coverage is 4.6% or 0.005, whichever is greater.

-End of Report-
(Appendix may follow)

Test No. 23-5691: Breath Alcohol Calibration Verification

DATA MUST BE SUBMITTED BY **Sept. 18, 2023, 11:59 p.m. EDT** TO BE INCLUDED IN THE REPORT

Participant Code: U1234F

WebCode: HWV2YU

The Accreditation Release section can be accessed by using the "Continue to Final Submission" button above. This information can be entered at any time prior to submitting to CTS.

Items Submitted (Sample Pack BRC):

Items 1-4: 34L NIST traceable reference material dry gas cylinders

Item 1: Lot # 08723001A1; Exp. Date: July 5, 2025

Item 2: Lot # 08723004A4; Exp. Date: July 5, 2025

Item 3: Lot # 08723002A2; Exp. Date: July 5, 2025

Item 4: Lot # 08723003A3; Exp. Date: July 5, 2025

1.) Detector type:

If additional detectors used, click the "Add Detector" link below.

2.) As a verification of calibration, report the ethanol concentration of each cylinder and the expanded uncertainty determined during the last calibration of the instrument. Results should be reported to three decimal places in g/210L and use a coverage factor of 2 for expanded uncertainty.

	Reported Concentration (g/210L)	Uncertainty (k=2)
--	---------------------------------	-------------------

Item 1:	<input type="text"/>	± <input type="text"/>
---------	----------------------	------------------------

Item 2:	<input type="text"/>	± <input type="text"/>
---------	----------------------	------------------------

Item 3:	<input type="text"/>	± <input type="text"/>
---------	----------------------	------------------------

Item 4:	<input type="text"/>	± <input type="text"/>
---------	----------------------	------------------------

Please note that it is the responsibility of the laboratory to normalize for barometric pressure and the wet/dry offset (if applicable).

3.) Instrument used:

4.) Barometric Pressure

5) List the type and amount of any adjustments made on the raw data to produce the reported concentration, such as for barometric pressure, the wet/dry offset etc.

6.) Additional Comments

Please note: Any additional formatting applied in the free form space below will not transfer to the Summary Report and may cause your information to be illegible. This includes additional spacing and returns that present your responses in lists and tabular formats.

RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and/or A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ASCLD/LAB, ANAB, and/or A2LA. (Accreditation Release section below must be completed.)
- This participant's data is **not** intended for submission to ASCLD/LAB, ANAB, and/or A2LA.

Have the laboratory's designated individual complete the following steps only if your laboratory is accredited in this testing/calibration discipline by one or more of the following Accreditation Bodies.

Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory.

ANAB Certificate No.
(Include ASCLD/LAB Certificate here)

A2LA Certificate No.

Step 2: Complete the Laboratory Identifying Information in its entirety.

Authorized Contact Person and Title

Laboratory Name

Location (City/State)



7 Eastgate Dr. • P.O. Box 790 • Jacksonville, IL 62651-0790
217-245-2183 • Fax: 217-243-7634 • www.ilmoproducts.com

Certificate of Analysis

Certificate ID: 15627
Part #: BAC34L050T
Cylinder Size: 34L
Lot Number: 08723001A1
Expiration: 7/5/2025

0.050 BAC (For the calibration of instruments used to determine breath alcohol concentration)

Contents: 34 Liters @ 500 psig 70°F (21°C)

Component:	Reported Concentration:	Analytical Accuracy (U, k=2):	Analytical Method:
Ethanol	130 ppm	+/- 0.002 BAC (G/210L) [5.2 ppm]	NDIR
Nitrogen	Balance		

***Traceable to:**

Certified Reference Material - 261.0 µmol/mol
Ethanol in Nitrogen - Serial No. ND7017 Lot No. 080722E2

Store in dry area, away from sources of heat, ignition and direct sunlight. Do not allow storage area to exceed 52 °C (125 °F).

Specialty Gas Lab Tech

06-06-2023
Issuance Date



The calibration results within this certificate were obtained at the facility listed above using equipment and standards capable of producing analytical results traceable to NIST, and apply only to the items contained on this certificate. ILMO Products Company makes no warranty or representation as to the suitability of the use of any information provided for any particular purpose. The information use is at the sole discretion and risk of the user. Liability shall be limited to established replacement cost of this material or service. This certificate applies only to the items described and shall not be reproduced other than in full, without written approval from the issuing facility.



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Certificate of Analysis

Certificate ID: 15628
Part #: BAC34L110T
Cylinder Size: 34L
Lot Number: 08723004A4
Expiration: 7/5/2025

0.110 BAC (For the calibration of instruments used to determine breath alcohol concentration)



Contents: 34 Liters @ 500 psig 70°F (21°C)

Component:	Reported Concentration:	Analytical Accuracy (U, k=2):	Analytical Method:
Ethanol	287 ppm	+/- 0.002 BAC (G/210L) [5.2 ppm]	NDIR
Nitrogen	Balance		

***Traceable to:**

Certified Reference Material - 261.0 µmol/mol
Ethanol in Nitrogen - Serial No. ND7017 Lot No. 080722E2

Store in dry area, away from sources of heat, ignition and direct sunlight. Do not allow storage area to exceed 52 °C (125 °F).


Specialty Gas Lab Tech


06-06-2023
Issuance Date



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ISO/IEC 17025:2017 Accredited Laboratory



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Certificate of Analysis

Certificate ID: 15629
Part #: BAC34L280T
Cylinder Size: 34L_280
Lot Number: 08723002A2
Expiration: 7/5/2025

0.280 BAC (For the calibration of instruments used to determine breath alcohol concentration)

Contents: 34 Liters @ 350 psig 70°F (21°C)

Component:	Reported Concentration:	Analytical Accuracy (U, k=2):	Analytical Method:
Ethanol	729 ppm	+/- 2% (rel. ppm)	Gravimetric
Nitrogen	Balance		

*NIST Traceable to:
Gravimetric Balance
Calibration Certificate No. 55752
Calibration Certificate No. 55753

Store in dry area, away from sources of heat, ignition and direct sunlight. Do not allow storage area to exceed 52 °C (125 °F).

Specialty Gas Lab Tech

06-06-2023
Issuance Date



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Certificate of Analysis


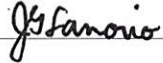
Certificate ID: 15630
Part #: BAC34L180T
Cylinder Size: 34L
Lot Number: 08723003A3
Expiration: 7/5/2025

0.180 BAC (For the calibration of instruments used to determine breath alcohol concentration)

Contents:	34 Liters @ 500 psig 70°F (21°C)		
Component:	Reported Concentration:	Analytical Accuracy (U, k=2):	Analytical Method:
Ethanol	469 ppm	+/- 2% (rel. ppm)	Gravimetric
Nitrogen	Balance		

*NIST Traceable to:
Gravimetric Balance
Calibration Certificate No. 55752
Calibration Certificate No. 55753

Store in dry area, away from sources of heat, ignition and direct sunlight. Do not allow storage area to exceed 52 °C (125 °F).


Specialty Gas Lab Tech


06-06-2023
Issuance Date



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