



## **Quantitative Drug Analysis - Cocaine HCl**

### **Test No. 21-5061 Summary Report**

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Each sample set consisted of two items with different concentrations of cocaine HCl. Participants were asked to determine the concentration of cocaine HCl in each item. Data were returned from 81 participants and are compiled into the following tables:

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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 two items containing different concentrations of cocaine HCl and levamisole HCl. Participants were requested to analyze each item and report the quantitative determination of cocaine HCl present in the samples.

### SAMPLE PREPARATION -

The appropriate amounts of cocaine HCl and levamisole HCl for each Item were thoroughly mixed to ensure homogeneity.

ITEMS 1 and 2 (PREPARATION): For each Item, approximately 350 mg of the powder was weighed out and deposited into a glassine bag, which was folded and secured with a label. The folded glassine bag was placed into a small zip top bag and heat sealed closed. The heat sealed bag was then placed into a pre-labeled 5 1/2 inch coin envelope.

SAMPLE PACK ASSEMBLY: One of each of the Item 1 and Item 2 envelopes was placed into a larger pre-labeled sample pack envelope.

VERIFICATION: Laboratories that conducted predistribution analysis of the samples reported consistent results that were comparable to the preparation concentrations of cocaine HCl. The following methods were used to examine the items: LC/MS, GC/FID, GC/MS.

<u>Item</u>	<u>Preparation Cocaine HCl</u>
1	66%
2	45%

## Summary Comments

This test was designed to allow participants to assess their proficiency in the determination of cocaine HCl concentrations. Each participant was supplied with a sample set consisting of two items containing levamisole HCl and different concentrations of cocaine HCl. Participants were requested to determine the cocaine HCl concentration for both items (Refer to the Manufacturer's Information for preparation details).

The results are separated into two tables: reported results and raw analytical data. The table of reported results shows the concentration that each participant would report according to their normal reporting procedures (e.g. mean, lowest result, truncated results). The table of raw data shows the results from each determination made by the laboratory to produce their reported results. Sixty seven participants reported using the mean of duplicate/several determinations as their reporting procedure. Eleven participants reported using a single determination. The remaining two participants reported "using the lowest value of duplicate/several determinations" and "the highest value."

The raw data was used to calculate the grand mean and the standard deviation (STD) for each item. For Item 1, four participants reported "extreme" data ( $\pm 3$  STD from the grand mean), and one participant did not report raw data. No participants reported "extreme" data for Item 2, however, one participant did not report raw data. The calculated grand mean of Item 1 was 64.16% with a standard deviation of 2.700, and the grand mean of Item 2 was 41.90% with a standard deviation of 3.744. These calculations are provided to assist the participants and accrediting bodies in determining the acceptability of the results.

As a supplemental examination of the raw data, Bivariate Control Analysis was also performed to analyze the measurements of both samples simultaneously. In this analysis, a comparative performance value (CPV) is provided for each participant, which is a unitless ratio indicating the number of standard deviations a participant's results are from the Grand Mean. The closer a participant's CPV is to zero, the more consistent their results are with the other participants' data. For the graphical portion, an ellipse was drawn so that 95% of the time a randomly selected participant was inside of it. Four participants, whose results fell outside of the 95% ellipse, but within the 99% control limit, were marked with a "\*" and were included in the calculations. Five participants, whose results fell outside of the 99% control limit, were marked with an "X" and also excluded from the calculations. One participant who did not report raw data for either item was marked with an "M" and also excluded from the calculations. The vertical orientation of the ellipse, as opposed to a 45 degree orientation, indicates that the statistical variation in Item 2 is higher in comparison to Item 1. For more information regarding Bivariate Control Analysis, please see the supplemental section at the end of this report.

Participants used a variety of methods to examine the samples. The most common method of analysis utilized was GC/FID, followed by LC.

# Reported Results

What is the concentration of cocaine HCl in each of the samples?

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
Preparation concentration:	66%	45%	
298ML9	64.4 ± 4.3 (%w/w)	43.1 ± 2.9 (%w/w)	2
2AZDQM	65 ± 4.901 (%)	35 ± 2.639 (%)	2
2LDGDL	63.7 ± 8.3 (%)	43.7 ± 6.7 (%)	3.12
2V28YD	232 ± 10 (mg)	150 ± 11 (mg)	2
2V8JKN	59.5 ± 1.7 (%)	41.3 ± 1.7 (%)	2
2Y7VGN	65.1 ± 1.7 (%)	42.9 ± 1.7 (%)	2
39N2MQ	66.2 ± 0.5 (%)	45.9 ± 0.1 (%)	2
3EDENE	63.3 ± 5.5 (%)	43.2 ± 3.8 (%)	3
3Q8X3K	65.3 ± 8.5 (%)	34.7 ± 4.6 (%)	3.12
3R3F4L	50.6 ± 6.6 (%)	36.3 ± 4.8 (%)	3.12
3ZUQHM	62.3 ± 4.0 (%)	40.7 ± 4.0 (%)	2 (95%)
47DDND	66.28 ± 0.63 (%)	44.34 ± 0.57 (%)	
4QZ6PU	56.3 (%)	43.2 (%)	
4U39BP	64.1 ± 2.8 (%)	36.4 ± 0.8 (%)	2
69ZE6K	66.2 ± 5.2 (%)	41.5 ± 5.5 (%)	2
6JXFJA	60.8 ± 4.8 (%)	37.1 ± 3.3 (%)	2.65
7EH3JM	62.9 ± 1.7 (%)	41.8 ± 1.7 (%)	2
86NJDD	60.0 ± 7.8 (%)	39.0 ± 5.1 (%)	3.12
88H8W9	64.5 ± 8.4 (%)	42.2 ± 5.5 (%)	3.12

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>66%</b>	<b>45%</b>	
8HZPNF	60.7 ± 7.9 (%)	38.1 ± 5.0 (%)	3.12
9XML4F	66.3 ± 8.7 (%)	43.4 ± 5.7 (%)	3.12
BJDPXH	65.2 ± 0.5 (%)	43.8 ± 0.5 (%)	2
BLJBM4	67.6 ± 6.2 (%)	44.6 ± 4.3 (%)	2.65
C9BRP9	65.6 ± 1.3 (%)	44.5 ± 2.7 (%)	2.78
CWYECE	64.71423 ± 1.7 (%)	44.70500 ± 1.7 (%)	2
D76LRE	193 ± 23 (milligrams)	119 ± 14 (milligrams)	12%
DGJJRC	63 ± 4.75 (%)	40 ± 3.02 (%)	2
EBDAZA	61.9 ± 8.1 (%)	39.1 ± 5.1 (%)	3.12
EGGB24	66.3 ± 5.8 (%)	45.3 ± 4.0 (%)	3
F979F3	67.4 ± 5.9 (%)	45.2 ± 4.0 (%)	3
FF6XW8	63.9 ± 8.4 (%)	39.5 ± 5.2 (%)	3.12
FL9XAH	60.95 ± 0.79 (%)	41.59 ± 0.84 (%)	2
G2ZWWB	61.50 ± 1.87 (%)	31.41 ± 1.82 (%)	2.78 (Item 1), 3.18 (Item 2)
G48EV8	63.6 ± 8.3 (%)	42.3 ± 5.5 (%)	3.12
GCZP63	65.8 ± 5.8 (%)	45.6 ± 4.0 (%)	
GEM4TC	67.2 ± 5.3 (%)	39.7 ± 3.1 (%)	2
H6RLR9	66.8 ± 2.3 (%)	42.7 ± 2.3 (%)	2
HAQU3B	60.4 ± 1.7 (%)	43.4 ± 1.7 (%)	2
JALZWA	63.4 ± 1.7 (%)	39.1 ± 1.7 (%)	2

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>66%</b>	<b>45%</b>	
JZVGEV	63.6 ± 4.9 (%)	42.6 ± 3.6 (%)	2.65
KRWDM4	60.6 ± 7.9 (%)	32.5 ± 4.3 (%)	3.12
L3F323	64.8 ± 4.0 (%)	43.6 ± 4.0 (%)	2 (95%)
L3XYPV	65.9 ± 5.8 (%)	45.3 ± 4.0 (%)	3
LKWBOX	66.6 ± 4.7 (%)	44.4 ± 3.1 (%)	3
LMKPM8	217 ± 13 (mg)	130 ± 13 (mg)	2
LREGWP	67.2 ± 3.2 (%)	44.5 ± 2.1 (%)	2
M2VQW3	64.2 ± 4.4 (%)	41.1 ± 2.8 (%)	2
MHKV4V	66.8 ± 5.8 (%)	43.8 ± 3.8 (%)	3
MNB7EU	66.1 ± 5.8 (%)	42.6 ± 3.7 (%)	3
MT3FNR	67 ± 11 (%)	43 ± 6.5 (%)	2.576
MWKDE4	212 ± 25 (milligrams)	158 ± 19 (milligrams)	12%
NTKNB2	64.8 (%)	43.1 (%)	
QGJ3W2	65.41 ± 1.55 (%)	45.64 ± 3.46 (%)	2.78
RBA2DJ	65.4 ± 5.7 (%)	43.4 ± 3.8 (%)	3
RNZVRX	67.6 ± 4.0 (%)	46.0 ± 4.0 (%)	2 (95%)
RW7WQ4	67.9 (%)	42.2 (%)	
T3CTA4	73.9 ± 2 (%)	49.6 ± 2 (%)	2
UUVGRW	15.39 (mg/ml)	11.72 (mg/ml)	
V8EJNU	79.3 ± 5.8 (g/100 g)	50.5 ± 4.7 (g/100 g)	2
VBGJNQ	60.0 ± 7.8 (%)	39.9 ± 5.2 (%)	3.12

TABLE 1

WebCode	Item 1 Reported Concentration (units)	Item 2 Reported Concentration (units)	Uncertainty (k)
<b>Preparation concentration:</b>	<b>66%</b>	<b>45%</b>	
VBJAWU	65.1 ± 4.0 (%)	43.0 ± 4.0 (%)	2 (95%)
VFPZYZ	66.62 ± 1.25 (%)	47.01 ± 5.23 (%)	2
VG46XX	63.9 ± 1.7 (%)	43.4 ± 1.7 (%)	2
VGJNHV	64.8 ± 1.7 (%)	44.2 ± 1.7 (%)	2
VMTPYT	63.6 ± 8.3 (%)	40.4 ± 5.3 (%)	3.12
VQUQ4W	65.7 ± 1.7 (%)	43.0 ± 1.7 (%)	2
VUREFX	58.87 ± 2.14 (%)	40.02 ± 3.62 (%)	2
WVL3YT	61.3 ± 8.0 (%)	40.4 ± 5.3 (%)	3.12
VXQPCX	61.71 ± 3.35 (%)	33.65 ± 4.41 (%)	
W94ABJ	66.52 ± 4.39 (%)	44.07 ± 2.91 (%)	2
WMLZAL	65.4 ± 5.7 (%)	43.3 ± 3.8 (%)	3
WRHNTE	64.5 ± 5.6 (%)	44.8 ± 3.9 (%)	3
WUMC6J	59.6 ± 7.8 (%)	38.7 ± 5.1 (%)	3.12
XKD68U	603 (µg/mg)	376 (µg/mg)	
XLN9GC	68.6 ± 2.2 (%)	49.7 ± 2.2 (%)	
Y4NGCQ	63.4 ± 1.7 (%)	40.8 ± 1.7 (%)	2
YFHWXK	60.3 ± 7.9 (%)	36.7 ± 4.8 (%)	3.12
YUXV8R	66.8 ± 4.0 (%)	43.7 ± 4.0 (%)	2( 95%)
Z7LJBQ	65.8 (%)	45.0 (%)	
ZFC3RK	63.9 ± 8.4 (%)	41.8 ± 5.5 (%)	3.12
ZG7QAF	65.1 ± 8.5 (%)	38.2 ± 5.0 (%)	3.12

# Reporting Procedures

TABLE 2

WebCode	Reporting Procedures
298ML9	The mean of duplicate/several determinations.
2AZDQM	The mean of duplicate/several determinations.
2LDGDL	The mean of duplicate/several determinations.
2V28YD	The mean of duplicate/several determinations.
2V8JKN	The mean of duplicate/several determinations.
2Y7VGN	The mean of duplicate/several determinations.
39N2MQ	The mean of duplicate/several determinations.
3EDENE	single sample
3Q8X3K	The mean of duplicate/several determinations.
3R3F4L	The mean of duplicate/several determinations.
3ZUQHM	The mean of duplicate/several determinations.
47DDND	The mean of duplicate/several determinations.
4QZ6PU	The mean of duplicate/several determinations.
4U39BP	The mean of duplicate/several determinations.
69ZE6K	The mean of duplicate/several determinations.
6JXFJA	The mean of duplicate/several determinations.
7EH3JM	The mean of duplicate/several determinations.
86NJDD	The mean of duplicate/several determinations.
88H8W9	The mean of duplicate/several determinations.
8HZPNF	The mean of duplicate/several determinations.
9XML4F	The mean of duplicate/several determinations.



TABLE 2

WebCode	Reporting Procedures
BJDPXH	The lowest value of duplicate/several determinations.
BLJBM4	The mean of duplicate/several determinations.
C9BRP9	The mean of duplicate/several determinations.
CWYECE	The mean of duplicate/several determinations.
D76LRE	The mean of duplicate/several determinations.
DGJJRC	The mean of duplicate/several determinations.
EBDAZA	The mean of duplicate/several determinations.
EGGB24	single sample
F979F3	Single sample
FF6XW8	The mean of duplicate/several determinations.
FL9XAH	The mean of duplicate/several determinations.
G2ZWVB	The mean of duplicate/several determinations.
G48EV8	The mean of duplicate/several determinations.
GCZP63	single sample
GEM4TC	The mean of duplicate/several determinations.
H6RLR9	The mean of duplicate/several determinations.
HAQU3B	The mean of duplicate/several determinations.
JALZWA	The mean of duplicate/several determinations.
JZVGEV	The mean of duplicate/several determinations.
KRWDM4	The mean of duplicate/several determinations.
L3F323	The mean of duplicate/several determinations.
L3XYPV	single sample

TABLE 2

WebCode	Reporting Procedures
LKW BXW	The mean of duplicate/several determinations.
LMKPM8	The mean of duplicate/several determinations.
LREGWP	The mean of duplicate/several determinations.
M2VQW3	The mean of duplicate/several determinations.
MHKV4V	quantitation of a single solid material sample
MNB7EU	single sample
MT3FNR	The mean of duplicate/several determinations.
MWKDE4	The mean of duplicate/several determinations.
NTKNB2	The highest value
QGJ3W2	The mean of duplicate/several determinations.
RBA2DJ	single sample
RNZVRX	The mean of duplicate/several determinations.
RW7WQ4	The mean of duplicate/several determinations.
T3CTA4	The mean of duplicate/several determinations.
UUVGRW	A single determination was made for each sample.
V8EJNU	The mean of duplicate/several determinations.
VBGJNQ	The mean of duplicate/several determinations.
VBJAWU	The mean of duplicate/several determinations.
VFPZYZ	The mean of duplicate/several determinations.
VG46XX	The mean of duplicate/several determinations.
VGJNHV	The mean of duplicate/several determinations.
VMTPYT	The mean of duplicate/several determinations.

TABLE 2

WebCode	Reporting Procedures
VQUQ4W	The mean of duplicate/several determinations.
VUREFX	The mean of duplicate/several determinations.
WL3YT	The mean of duplicate/several determinations.
VXQPCX	The mean of duplicate/several determinations.
W94ABJ	The mean of duplicate/several determinations.
WMLZAL	Single Sample
WRHNTE	single samples
XKD68U	The mean of duplicate/several determinations.
XLN9GC	The mean of duplicate/several determinations.
Y4NGCQ	The mean of duplicate/several determinations.
YFHWXK	The mean of duplicate/several determinations.
YUXV8R	The mean of duplicate/several determinations.
Z7LJBQ	The mean of duplicate/several determinations.
ZFC3RK	The mean of duplicate/several determinations.
ZG7QAF	The mean of duplicate/several determinations.

Response Summary		Participants: 80
The mean of duplicate/several determinations:	67	(83.8%)
The lowest value of duplicate/several determinations:	1	(1.3%)
Single determination:	11	(13.8%)
Other:	1	(1.3%)

# Raw Data & Statistical Analysis

List of raw data determinations in percent.

TABLE 3 - Item 1

WebCode	Preparation target concentration : 66%								Mean
298ML9	63.90	65.00							64.45
2AZDQM	65.20	63.90							64.55
2LDGDL	63.50	64.00							63.75
2V28YD	67.60								67.60
2V8JKN	59.39	59.40	59.70	59.80					59.57
2Y7VGN	65.14	65.23							65.18
39N2MQ	65.99	66.01	66.05	66.11	66.39	66.41	66.45	66.46	66.23
3EDENE	63.40								63.40
3Q8X3K	65.10	65.60							65.35
3R3F4L	50.20	51.10							50.65 X
3ZUQHM	62.17	62.40	61.97	62.47	62.37	62.55			62.32
47DDND	65.38	66.36	66.42	66.98					66.29
4QZ6PU	56.50	56.10							56.30
4U39BP	62.80	62.80	62.80	62.80	65.30	65.40	65.40	65.40	64.09
69ZE6K	65.80	66.50							66.15
6JXFJA	60.10	60.48	61.18	61.06	60.93	61.29			60.84
7EH3JM	63.59	63.52	61.99	62.51					62.90
86NJDD	61.60	58.60							60.10
88H8W9	64.40	64.60							64.50
8HZPNF	60.80	60.60							60.70
9XML4F	66.20	66.50							66.35
BJDPXH	65.50	65.10	64.70	65.20					65.13
BLJBM4	67.14	70.08	67.93	66.99	67.23	66.32			67.62
C9BRP9	64.50	66.70	65.40	65.40	65.90				65.58

TABLE 3 - Item 1

WebCode	Preparation target concentration : 66%							Mean
CWYECE	64.62	65.16	64.51	64.58				64.71
D76LRE	57.98	58.69						58.33
DGJJRC	63.49	61.52						62.51
EBDAZA	60.80	63.10						61.95
EGGB24	66.34							66.34
F979F3	67.48							67.48
FF6XW8	63.90	64.00						63.95
FL9XAH	60.60	60.20	61.20	61.00	61.40	61.20	61.00	60.94
G2ZWWB	61.75	60.82	62.08	61.36	61.48			61.50
G48EV8	64.00	63.40						63.70
GCZP63	65.80	23.00						44.40 X
GEM4TC	66.91	66.97	67.59	67.28				67.19
H6RLR9	66.78	66.95	66.93	66.71				66.84
HAQU3B	60.85	60.83	60.15	59.91				60.43
JALZWA	63.34	63.47	63.38	63.56				63.44
JZVGEV	63.24	63.75	63.74	63.78	63.26	63.66		63.57
KRWDM4	60.20	61.20						60.70
L3F323	65.03	65.08	65.27	64.43	64.66	64.49		64.83
L3XYPV	65.90							65.90
LKWBXW	66.69	66.64						66.67
LMKPM8	64.07	64.07	64.14	61.60	62.90	62.69		63.24
LREGWP	67.00	67.30						67.15
M2VQW3	64.50	63.90						64.20
MHKV4V	66.89							66.89
MNB7EU	66.12							66.12
MT3FNR	68.05	67.95	67.63					67.88

TABLE 3 - Item 1

WebCode	Preparation target concentration : 66%								Mean
MWKDE4	68.97	68.52							68.75
NTKNB2	64.80	62.60							63.70
QGJ3W2	66.60	66.87	65.91	65.86	64.48	64.49	65.31	65.44	65.62
RBA2DJ	65.46								65.46
RNZVRX	67.72	67.60	67.79	67.47	67.46	67.39			67.57
RW7WQ4	67.88	67.97							67.93
T3CTA4	71.90	75.80	74.20						73.97 X
V8EJNU	80.00	80.20	80.90	82.10	82.10	81.90	75.50	76.00	79.84 X
VBGJNQ	60.00	60.20							60.10
VBJAWU	65.42	65.18	65.30	64.74	64.84	64.96			65.08
VFPZYZ	66.81	67.89	67.10	65.60	66.63	66.34	66.46	66.31	66.64
VG46XX	64.10	63.83	63.73	64.15					63.95
VGJNHV	65.22	65.20	64.29	64.54					64.81
VMTPYT	63.90	63.40							63.65
VQUQ4W	65.56	65.95							65.75
VUREFX	60.35	58.11	58.77	58.27	58.84				58.87
WL3YT	61.90	60.70							61.30
VXQPCX	62.99	59.64	59.58	62.06	64.27				61.71
W94ABJ	66.84	66.19							66.52
WMLZAL	65.44								65.44
WRHNTTE	64.56								64.56
WUMC6J	58.60	60.70							59.65
XKD68U	61.60	58.90							60.25
XLN9GC	68.60	68.60							68.60
Y4NGCQ	64.03	64.19	62.67	62.79					63.42
YFH WXK	60.20	60.40							60.30

TABLE 3 - Item 1

WebCode	Preparation target concentration : 66%						Mean
YUXV8R	67.00	66.61	66.71	66.82	66.66	67.10	66.82
Z7LJBQ	66.30	65.30					65.80
ZFC3RK	63.60	64.10					63.85
ZG7QAF	65.40	64.70					65.05

Statistical Analysis for Item 1		Participants: 81
Preparation Target Concentration:	<b>66%</b>	Number of Participants Included: <b>76</b>
Grand Mean:	<b>64.16</b>	Number of Participants Excluded: <b>4</b>
Standard Deviation:	<b>2.700</b>	Number of Participants without Raw Data: <b>1</b>

TABLE 3 - Item 2

WebCode	Preparation target concentration : 45%								Mean
298ML9	42.60	43.50							43.05
2AZDQM	35.90	34.20							35.05
2LDGDL	44.10	43.20							43.65
2V28YD	44.80								44.80
2V8JKN	40.87	40.92	41.85	41.93					41.39
2Y7VGN	43.43	42.40							42.92
39N2MQ	45.91	45.91	45.91	45.91	45.92	45.93	45.94	45.95	45.92
3EDENE	43.21								43.21
3Q8X3K	34.80	34.70							34.75
3R3F4L	36.40	36.30							36.35
3ZUQHM	41.56	41.53	41.60	39.70	39.78	39.87			40.67
47DDND	43.98	43.98	45.07						44.34
4QZ6PU	43.50	42.90							43.20
4U39BP	36.00	36.10	36.10	36.10	36.80	36.80	36.80	36.80	36.44
69ZE6K	42.50	42.78	40.06	40.46					41.45
6JXFJA	37.20	37.11	37.40	35.92	36.86	37.84			37.06
7EH3JM	42.40	42.25	41.49	41.44					41.89
86NJDD	39.50	38.40							38.95
88H8W9	42.20	42.20							42.20
8HZPNF	38.20	38.10							38.15
9XML4F	43.60	43.30							43.45
BJDPXH	44.20	43.90	43.80	43.40					43.83
BLJBM4	45.13	44.02	45.37	44.83	45.40	42.81			44.59
C9BRP9	41.70	45.30	46.00	44.10	45.40				44.50
CWYECE	46.05	46.17	43.11	43.48					44.71
D76LRE	35.85	36.01							35.93



TABLE 3 - Item 2

WebCode	Preparation target concentration : 45%						Mean	
DGJJRC	41.40	38.47					39.93	
EBDAZA	39.00	39.30					39.15	
EGGB24	45.32						45.32	
F979F3	45.22						45.22	
FF6XW8	39.50	39.50					39.50	
FL9XAH	41.06	41.75	41.75	42.60	41.09	41.53	41.37	41.59
G2ZWVB	30.93	32.15	32.05	30.49				31.41
G48EV8	42.60	42.10						42.35
GCZP63	45.62	32.00						38.81
GEM4TC	39.47	39.91	39.70	39.86				39.74
H6RLR9	41.94	42.26	43.30	43.39				42.72
HAQU3B	43.80	43.73	43.07	43.13				43.43
JALZWA	39.05	38.62	39.51	39.44				39.15
JZVGEV	42.06	41.98	42.76	43.33	42.79	42.94		42.64
KRWDM4	34.10	30.90						32.50
L3F323	43.51	43.67	43.51	43.59	43.60	43.57		43.57
L3XYPV	45.39							45.39
LKWBXW	44.38	44.56						44.47
LMKPM8	37.03	37.82	40.18	39.53	38.76	37.69		38.50
LREGWP	43.40	45.50						44.45
M2VQW3	40.80	41.30						41.05
MHKV4V	43.86							43.86
MNB7EU	42.65							42.65
MT3FNR	43.35	44.13	44.20					43.89
MWKDE4	47.77	46.47						47.12
NTKNB2	43.10	43.00						43.05

TABLE 3 - Item 2

WebCode	Preparation target concentration : 45%								Mean
QGJ3W2	44.97	44.68	46.95	47.80	44.71	44.23	48.34	48.40	46.26
RBA2DJ	43.50								43.50
RNZVRX	45.55	45.46	45.45	46.45	46.50	46.40			45.97
RW7WQ4	42.01	42.32							42.16
T3CTA4	49.30	49.10	50.40						49.60
V8EJNU	53.00	53.20	53.60	50.10	50.10	48.50	48.10	50.00	50.83
VBGJNQ	39.00	40.90							39.95
VBJAWU	42.61	42.68	42.64	43.28	43.41	43.33			42.99
VFPZYZ	49.60	43.64	47.05	52.03	46.95	44.58	46.90	47.62	47.30
VG46XX	42.90	43.00	43.55	44.20					43.41
VGJNHV	42.93	42.87	45.64	45.46					44.22
VMTPYT	40.40	40.50							40.45
VQUQ4W	43.01	43.18							43.10
VUREFX	42.01	40.33	38.17	39.74	39.84				40.02
VVL3YT	40.90	40.10							40.50
VXQPCX	34.40	30.20	33.40	33.70	35.10	33.80	34.50	34.10	33.65
W94ABJ	44.31	43.83							44.07
WMLZAL	43.36								43.36
WRHNTE	44.81								44.81
WUMC6J	38.70	38.90							38.80
XKD68U	35.50	39.60							37.55
XLN9GC	50.20	49.30							49.75
Y4NGCQ	41.65	41.70	39.80	40.23					40.85
YFHWXK	36.60	36.80							36.70
YUXV8R	43.71	43.64	43.67	43.71	43.75	43.89			43.73
Z7LJBQ	44.90	45.00							44.95

TABLE 3 - Item 2

WebCode	Preparation target concentration : 45%		Mean
ZFC3RK	41.50	42.10	41.80
ZG7QAF	38.90	37.50	38.20

Statistical Analysis for Item 2		Participants: 81
Preparation Target Concentration:	45%	Number of Participants Included: 80
Grand Mean:	41.90	Number of Participants Excluded: 0
Standard Deviation:	3.744	Number of Participants without Raw Data: 1

TABLE 3 - Response Summary

<b>Response Summary</b>	<b>Item 1</b>	<b>Item 2</b>
<b>Preparation concentration</b>	<b>66%</b>	<b>45%</b>
Grand Mean	64.16	41.90
Standard Deviation	2.700	3.744

## Method of Analysis

TABLE 4

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
298ML9		✓						
2AZDQM		✓						
2LDGDL							✓	
2V28YD		✓						
2V8JKN							✓	
2Y7VGN							✓	
39N2MQ							✓	
3EDENE		✓						
3Q8X3K				✓			✓	
3R3F4L							✓	
3ZUQHM							✓	
47DDND		✓						
4QZ6PU								HPLC
4U39BP							✓	
69ZE6K					✓			NMR
6JXFJA							✓	
7EH3JM							✓	
86NJDD							✓	
88H8W9							✓	
8HZPNF							✓	
9XML4F							✓	
BJDPXH								NMR
BLJBM4							✓	
C9BRP9							✓	
CWYECE							✓	
D76LRE				✓				
DGJJRC								HPLC
EBDAZA							✓	
EGGB24		✓						
F979F3		✓						
FF6XW8							✓	
FL9XAH							✓	
G2ZWWB							✓	
G48EV8							✓	
GCZP63		✓						balance
GEM4TC		✓				✓		

TABLE 4

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
H6RLR9							✓	
HAQU3B							✓	
JALZWA							✓	
JZVGEV							✓	
KRWDM4							✓	
L3F323							✓	
L3XYPV		✓						electronic balance
LKWBXW								HPLC
LMKPM8							✓	
LREGWP		✓						
M2VQW3							✓	
MHKV4V		✓						Electronic balance
MNB7EU		✓						
MT3FNR					✓			
MWKDE4				✓				
NTKNB2								LC/DAD
QGJ3W2							✓	
RBA2DJ		✓						
RNZVRX							✓	
RW7WQ4							✓	
T3CTA4							✓	
UUVGRW				✓				
V8EJNU				✓				
VBGJNQ				✓			✓	
VBJAWU							✓	
VFPZYZ		✓				✓		
VG46XX							✓	
VGJNHV							✓	
VMPYTY				✓			✓	Color test
VQUQ4W							✓	
VUREFX							✓	
VWL3YT							✓	
VXQPCX							✓	NMR
W94ABJ							✓	
WMLZAL		✓						
WRHNTE		✓						
WUMC6J							✓	
XKD68U		✓				✓		

TABLE 4

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
XLN9GC				✓				HPLC
Y4NGCQ							✓	
YFHWXK							✓	
YUXV8R							✓	
Z7LJBQ							✓	
ZFC3RK							✓	
ZG7QAF							✓	

Response Summary								Participants: 81
Method:	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	
Participants:	0	18	0	8	2	3	51	
Percent:	0.0%	22.2%	0.0%	9.9%	2.5%	3.7%	63.0%	

## Additional Comments

TABLE 5

WebCode	Additional Comments
298ML9	Levamisole was indicated in item 1 and item 2.
2V8JKN	Test No. 21-5061-005 sample pack DQ2
39N2MQ	12 injections made up the average. The lowest 2 and the highest 2 values for each item were excluded from question 2 above.
69ZE6K	Item 1 was analyzed by NMR, Item 2 was analyzed by UPLC-MSMS
FL9XAH	both samples also contain levamisole/tetramisole confirmed by gcms
MHKV4V	Reporting percent of cocaine base is preferable.
NTKNB2	Item 1 contains 27,5 % of Levamisol. Item 2 contains 42,0 % of Levamisol.
QGJ3W2	Additional raw data for Items 1 & 2. Item 1: 64.44 %, 64.73 %. Item 2: 43.07 %, 43.29 %.
VFPZYZ	Sample 2 generated quite inhomogenous data - this is in contrast to sample 1. Analyses were performed on three different days. Please note that due to a rather large discrepancy in data of sample 2 we analyzed each sample nine times; above only eight fields are available for entering the raw data. In the following all nine raw data values are given (in percent): item #1: 66.81; 67.89; 67.10; 65.60; 66.63; 66.34; 66.46; 66.31; 66.47. item #2: 49.60; 43.64; 47.05; 52.03; 46.95; 44.58; 46.90; 47.62; 44.74.
VXQPCX	Item 1 and Item 2 had two separate k values: Item 1-2.78. Item 2-2.57.
W94ABJ	Method reports in base. Results have been converted using a factor of 0.89



# Supplemental: Hotelling T-Squared Bivariate Control Analysis

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Hotelling T-Squared Bivariate Control Analysis is used in many other industries to examine results. Although not typically used in forensic science, CTS is presenting an introduction to this type of statistical data analysis. A laboratory may choose to delve deeper in a participant's results by studying both sets of statistics available in this report. The statistics presented in Table 3 (Raw Data) of this report examine the results of each item independently of each other. However, because the same materials are chosen for both samples, there should be a correlation of measurement performance between the two samples. A bivariate analysis technique judges measurement performance on both samples simultaneously, represented as an ellipse. For each participant, the mean of Item 1 (x-axis) is plotted against the mean of Item 2 (y-axis). The horizontal and vertical cross-hairs are the grand means for each Item. When 20 or more participants are included in the statistics, an ellipse is drawn so that 95% of the time a randomly selected participant will be included inside.

When considering your participant's position on the plot relative to the ellipse, remember that, generally speaking, if a participant's plotted point falls on the major axis outside of the ellipse, the participant is consistent in its measurements between the two samples but exhibits an offset from the grand mean (systematic difference). If a plotted point falls to the side of the ellipse, it indicates possible differences in the way that the participant tested the two samples or differences in sample behavior (consistency difference). The two-sample plot enables you to see which sample, if either, is "extreme" and to ascertain the nature of the "extreme" data.

### Systematic Difference

Bias is illustrated in the control ellipse on the two sample plot. If a particular analysis/sample combination did not show bias, the control ellipse would become a circle. Differences in procedures, conditions, instrumentation and sample preparation all contribute to the bias of a participant. When these differences become too large, a participant may receive a Data Flag. When the test results for both samples are both high or low compared to the group, a participant has a fixed set of factors on which to focus to identify a cause. Furthermore, since additional testing on similar samples should produce similar high or low results, it is possible to determine that a systematic error has been successfully corrected.

### Consistency Difference

The participant's results indicate that there are differences in the way the two samples tested (the plotted point falls to the side of the ellipse). This type of error may be attributed to the analyst deviating from the procedure when testing one of the samples or a material interaction occurrence with the instrument or room conditions. The inconsistency is reflected in the Comparative Performance Values (CPV) for the two samples, such as a +1.5 CPV for Item 1 and a -2.2 CPV for Item 2. CPV is the number of standard deviations a value is from the grand mean.

Key for Data Flags		
<u>Data Flag</u>	<u>Statistically Included/Excluded</u>	<u>Explanation</u>
*	Included	Results fall outside 95% ellipse, but within a 99% control limit (ellipse) that is calculated.
X	Excluded	Results fall outside of 99% control limit.
M	Excluded	Data is missing for at least one item

## Bivariate Control Analysis

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
298ML9		64.45	0.180	0.11	43.05	1.269	0.31
2AZDQM	*	64.55	0.280	0.14	35.05	-6.731	-1.83
2LDGDL		63.75	-0.520	-0.15	43.65	1.869	0.47
2V28YD		67.60	3.330	1.27	44.80	3.019	0.77
2V8JKN		59.57	-4.700	-1.70	41.39	-0.389	-0.14
2Y7VGN		65.18	0.915	0.38	42.92	1.135	0.27
39N2MQ		66.23	1.964	0.77	45.92	4.141	1.07
3EDENE		63.40	-0.871	-0.28	43.21	1.426	0.35
3Q8X3K	*	65.35	1.080	0.44	34.75	-7.031	-1.91
3R3F4L	X	50.65	-13.620	-5.01	36.35	-5.431	-1.48
3ZUQHM		62.32	-1.948	-0.68	40.67	-1.109	-0.33
47DDND		66.29	2.015	0.79	44.34	2.562	0.65
4QZ6PU	X	56.30	-7.970	-2.91	43.20	1.419	0.35
4U39BP		64.09	-0.182	-0.03	36.44	-5.344	-1.46
69ZE6K		66.15	1.880	0.74	41.45	-0.330	-0.12
6JXFJA		60.84	-3.430	-1.23	37.06	-4.726	-1.30
7EH3JM		62.90	-1.368	-0.47	41.89	0.112	0.00
86NJDD		60.10	-4.170	-1.51	38.95	-2.831	-0.79
88H8W9		64.50	0.230	0.12	42.20	0.419	0.08
8HZPNF		60.70	-3.570	-1.28	38.15	-3.631	-1.00
9XML4F		66.35	2.080	0.81	43.45	1.669	0.41
BJDPXH		65.13	0.855	0.36	43.83	2.044	0.51
BLJBM4		67.62	3.345	1.28	44.59	2.812	0.72
C9BRP9		65.58	1.310	0.52	44.50	2.719	0.69
CWYECE		64.71	0.444	0.20	44.71	2.924	0.75

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
D76LRE		58.33	-5.935	-2.16	35.93	-5.853	-1.60
DGJJRC		62.51	-1.764	-0.61	39.93	-1.846	-0.53
EBDAZA		61.95	-2.320	-0.82	39.15	-2.631	-0.74
EGGB24		66.34	2.073	0.81	45.32	3.535	0.91
F979F3		67.48	3.206	1.23	45.22	3.441	0.89
FF6XW8		63.95	-0.320	-0.08	39.50	-2.281	-0.64
FL9XAH		60.94	-3.327	-1.19	41.59	-0.188	-0.08
G2ZWWB	*	61.50	-2.772	-0.99	31.41	-10.376	-2.80
G48EV8		63.70	-0.570	-0.17	42.35	0.569	0.12
GCZP63	X	44.40	-19.870	-7.32	38.81	-2.969	-0.83
GEM4TC		67.19	2.918	1.12	39.74	-2.046	-0.58
H6RLR9		66.84	2.573	0.99	42.72	0.941	0.22
HAQU3B		60.43	-3.835	-1.38	43.43	1.653	0.41
JALZWA		63.44	-0.832	-0.27	39.15	-2.631	-0.74
JZVGEV		63.57	-0.698	-0.22	42.64	0.862	0.20
KRWDM4	*	60.70	-3.570	-1.28	32.50	-9.281	-2.51
L3F323		64.83	0.556	0.24	43.57	1.791	0.45
L3XYPV		65.90	1.633	0.64	45.39	3.611	0.93
LKW BXW		66.67	2.398	0.93	44.47	2.688	0.68
LMKPM8		63.24	-1.026	-0.34	38.50	-3.282	-0.91
LREGWP		67.15	2.880	1.11	44.45	2.669	0.68
M2VQW3		64.20	-0.070	0.01	41.05	-0.731	-0.23
MHKV4V		66.89	2.619	1.01	43.86	2.079	0.52
MNB7EU		66.12	1.846	0.72	42.65	0.866	0.20
MT3FNR		67.88	3.607	1.37	43.89	2.112	0.53
MWKDE4		68.75	4.476	1.70	47.12	5.340	1.39
NTKNB2		63.70	-0.570	-0.17	43.05	1.269	0.31

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
QGJ3W2		65.62	1.350	0.54	46.26	4.479	1.16
RBA2DJ		65.46	1.188	0.48	43.50	1.718	0.43
RNZVRX		67.57	3.302	1.26	45.97	4.186	1.09
RW7WQ4		67.93	3.657	1.39	42.16	0.383	0.07
T3CTA4	X	73.97	9.697	3.63	49.60	7.819	2.06
UUVGRW	M						
V8EJNU	X	79.84	15.568	5.80	50.83	9.044	2.38
VBGJNQ		60.10	-4.170	-1.51	39.95	-1.831	-0.52
VBJAWU		65.08	0.806	0.34	42.99	1.211	0.29
VFPZYZ		66.64	2.373	0.92	47.30	5.515	1.44
VG46XX		63.95	-0.319	-0.08	43.41	1.631	0.40
VGJNHV		64.81	0.542	0.24	44.22	2.443	0.62
VMPYTY		63.65	-0.620	-0.19	40.45	-1.331	-0.39
VQUQ4W		65.75	1.484	0.59	43.10	1.314	0.32
VUREFX		58.87	-5.402	-1.96	40.02	-1.763	-0.50
WV3L3YT		61.30	-2.970	-1.06	40.50	-1.281	-0.38
VXQPCX		61.71	-2.562	-0.91	33.65	-8.131	-2.20
W94ABJ		66.52	2.245	0.87	44.07	2.289	0.58
WMLZAL		65.44	1.172	0.47	43.36	1.583	0.39
WRHNTE		64.56	0.288	0.15	44.81	3.026	0.78
WUMC6J		59.65	-4.620	-1.67	38.80	-2.981	-0.83
XKD68U		60.25	-4.020	-1.45	37.55	-4.231	-1.16
XLN9GC		68.60	4.330	1.64	49.75	7.969	2.10
Y4NGCQ		63.42	-0.852	-0.28	40.85	-0.936	-0.28
YFHWXK		60.30	-3.970	-1.43	36.70	-5.081	-1.39
YUXV8R		66.82	2.546	0.98	43.73	1.947	0.49
Z7LJBQ		65.80	1.530	0.61	44.95	3.169	0.81

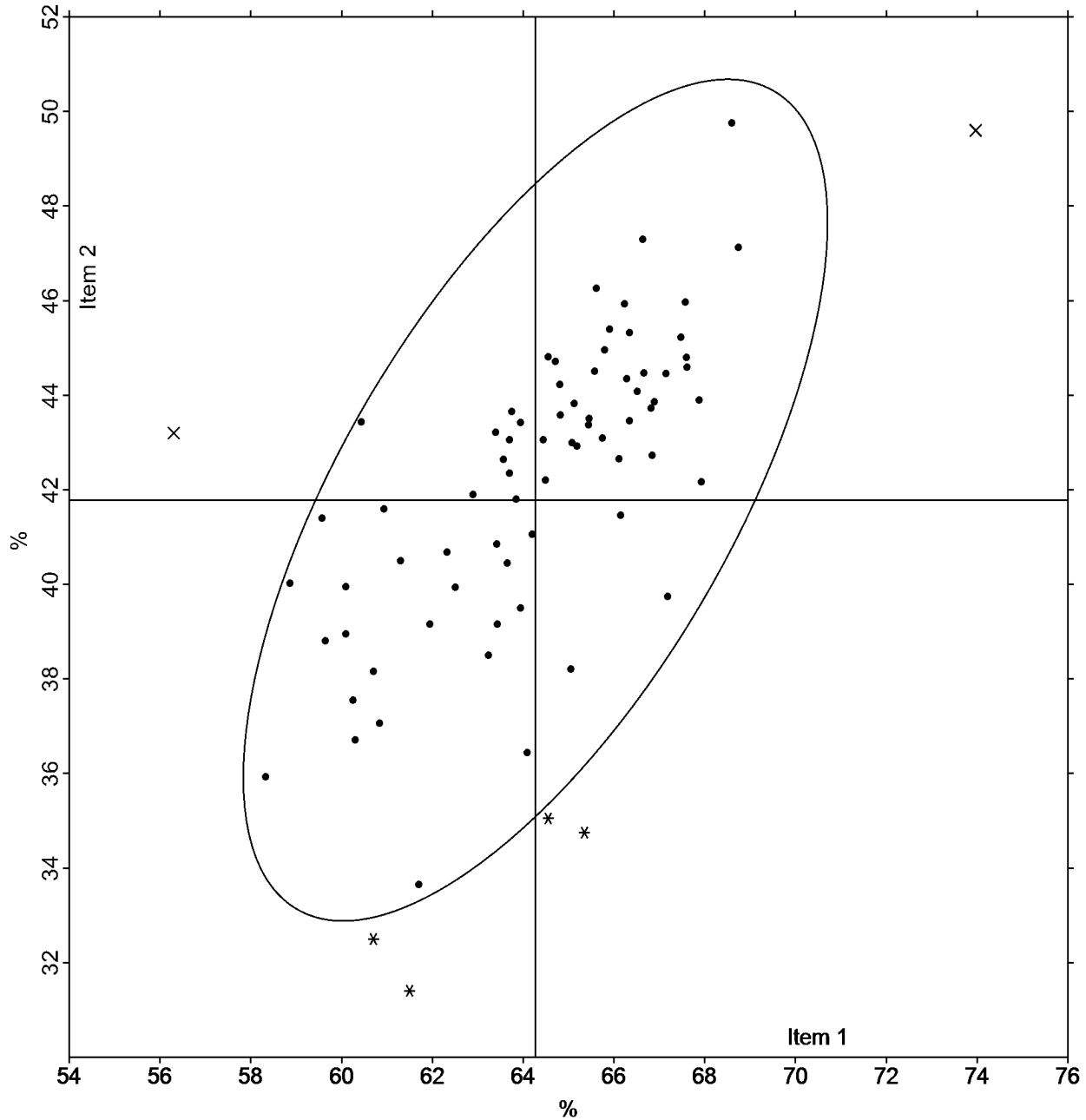
WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
ZFC3RK		63.85	-0.420	-0.12	41.80	0.019	-0.03
ZG7QAF		65.05	0.780	0.33	38.20	-3.581	-0.99

Response Summary		Item 1	Item 2	Participants: 81
<b>Preparation Concentration</b>		<b>66%</b>	<b>45%</b>	
Grand Mean		64.27	41.78	
Standard Deviation		2.56	3.54	
Participants Included: 75	Participants Excluded: 5	Participants without Raw Data for both items: 1		

# Bivariate Control Analysis

Item 1 Grand Mean: 64.27

Item 2 Grand Mean: 41.78



\*Three participants marked as outliers (X) are not seen on the graph above due to having mean values that are outside of the x-axis or y-axis percentage ranges.

-End of Report-  
(Appendix may follow)

## Test No. 21-5061: Quantitative Drug Analysis - Cocaine HCl

DATA MUST BE SUBMITTED BY **Dec. 13, 2021, 11:59 p.m.** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: VK7BBJ

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.

### Test Description:

Investigators have submitted two powdered cocaine HCl samples from separate cases to be quantitatively examined. Using your laboratory's procedures, analyze each sample and report the quantitative determination of cocaine HCl present in the samples.

*-Please follow your laboratory's policies and procedures for sample homogenization.*

*-This is not intended as a qualitative test but rather as a quantitative examination of the cocaine HCl present in the samples.*

### Items Submitted (Sample Pack DQ2):

Items 1 & 2: Powdered cocaine HCl samples

1a.) What is the concentration of cocaine HCl in each of the samples? (Results should be reported using your laboratory reporting criteria for decimal places, uncertainty, and units.)

Reported Concentration	Uncertainty (k= <input style="width: 40px; border: 1px solid black;" type="text" value="1"/> )	Units
Item 1: <input style="width: 150px;" type="text"/>	± <input style="width: 80px;" type="text"/>	( <input style="width: 100px;" type="text"/> )
Item 2: <input style="width: 150px;" type="text"/>	± <input style="width: 80px;" type="text"/>	( <input style="width: 100px;" type="text"/> )

1b.) Are the values listed above:

The mean of duplicate / several determinations?

The lowest value of duplicate / several determinations?

Other? (Specify):

2.) Please list your raw data determinations below in percent of cocaine HCl. (Results not reported in % will be excluded from statistical calculations.)

Item 1 (%)	Item 2 (%)
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

3.) What methods were used to quantitatively examine the items?

- GC
- GC/MS
- GC/FID
- LC
- LC/MS
- Other (specify):
- FTIR
- UV

4.) 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)