



## **Quantitative Drug Analysis 16-505 Summary Report**

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This test was sent to 84 participants. Each sample set consisted of two items with different concentrations of methamphetamine HCl. Participants were asked to determine the concentration of methamphetamine HCl in each item. Data were returned from 69 participants (82% response rate) 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 methamphetamine HCl and dimethyl sulfone. Participants were requested to analyze each item and report the quantitative determination of methamphetamine HCl present in the samples.

### SAMPLE PREPARATION-

The appropriate amount of methamphetamine HCl and dimethyl sulfone for each item were mixed using a mortar and pestle for over an hour to ensure homogeneity.

ITEMS 1 and 2 (PREPARATION): For each Item, approximately 500 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 methamphetamine HCl.

<u>Item</u>	<u>Preparation methamphetamine HCl</u>
1	75%
2	90%

## **Summary Comments**

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

The results are separated into two tables, the reported results and the 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 result. Blanks shown in the raw data table represent participants that did not report raw data values or raw data that was not reported in the requested units (%).

The raw data was used to calculate the grand mean and the standard deviation for each item. Participants with "extreme" data ( $\pm 3$  STD from grand mean) have been marked with an "X" and their results were excluded from the calculations of the grand mean and standard deviation. Two participants reported extreme data for Item 1 and three participants reported extreme data for Item 2.

The grand mean and standard deviation are supplied to assist the participants and accrediting bodies in determining the acceptability of the results.

# Reported Results

*What is the concentration of Methamphetamine HCl in each of the samples?*

TABLE 1

WebCode	Item 1	Item 2	Coverage factor k
Preparation concentration:	75%	90%	
27N2ZU	79 +/- 7.9 (%)	92 +/- 9.2 (%)	10%
2DH44Q	73.7 +/- 3.3 (%)	90.9 +/- 3.3 (%)	3
2EDL6R	74.3 +/- 5.0 (%)	89.0 +/- 5.0 (%)	2
2GK44M	75 +/- 6 (%)	90 +/- 7 (%)	2
2QBPAL	66.4% +/- 1.88% (wt %)	85.9% +/- 2.31% (wt %)	2
33JR9N	72 +/- 5 (%)	90 +/- 5 (%)	2
3LRV7T	75 +/- 17 (%)	90 +/- 9.2 (%)	3
3WDYET	75.2 +/- 1.7 (%)	91.4 +/- 2.0 (%)	2.20%
4JH3RK	75.4 +/- 4.9 (%)	92.0 +/- 5.9 (%)	2
4KT4DJ	76 +/- 2 (%)	93 +/- 2 (%)	2
4U47YK	73 +/- 2 (%)	90 +/- 2 (%)	2
6AR4EK	76.65 +/- 7.90 (%)	94.01 +/- 7.90 (%)	2
6BMLFL	81 +/- 12 (%)	95 +/- 14 (%)	3
6K9MXG	75.6 (%)	89.8 (%)	2
7BHNGK	73.0 +/- 1.0 (%)	89.5 +/- 1.0 (%)	2
7CYHKQ	74 +/- 17 (%)	91 +/- 9.2 (%)	3
7FAV3P	74 +/- 16 (%)	89 +/- 9.2 (%)	3
7MB8YM	72.9 +/- 5.0 (%)	89.3 +/- 5.0 (%)	2

TABLE 1

<b>WebCode</b>	<b>Item 1</b>	<b>Item 2</b>	<b>Coverage factor k</b>
<b>Preparation concentration:</b>	<b>75%</b>	<b>90%</b>	
7W2T6K	77,69 +/- 1,50 (%)	92,56 +/- 0,88 (%)	
838MYF	68.4% +/- 2.7% (weight %)	88.1% +/- 2.0% (weight %)	2
87GZGE	78.7 +/- 5.1 (%)	93.5 +/- 6.0 (%)	2
8BCUEF	75.4 +/- 4.9 (%)	91.4 +/- 5.9 (%)	2
93L99H	74.18 +/- 7.89 (%)	89.67 +/- 7.89 (%)	2
A2KVZF	76 +/- 5 (%)	92 +/- 5 (%)	2
ADCG7B	72 +/- 4 (%)	86 +/- 4 (%)	2
BAUL4H	74.3 +/- 5.0 (%)	90.1 +/- 5.0 (%)	2
C8KUNB	82 +/- 14 (%)	102 +/- 17 (%)	2
D8EYHA	75.4 +/- 4.9 (%)	89.9 +/- 5.8 (%)	2
DJ9F8B	76.8 +/- 5.0 (%)	91.3 +/- 5.9 (%)	2
DTY2D9	70.6 +/- 3 (%)	88.55 +/- 3 (%)	
DXTVBA	68.7 +/- 0.4 (% wt)	89.2 +/- 1.4 (% wt)	2
DY2AHF	73% +/- 9% (%)	82% +/- 10% (%)	2.570
EJ3K2A	75.9 +/- 4.9 (percent)	92.2 +/- 5.9 (percent)	2
F92J2B	75.4 +/- 4.1 (%)	90.2 +/- 4.1 (%)	2
FETNUE	72.2 +/- 3.7 (%)	90.5 +/- 4.6 (%)	2
FUJRD4	73 +/- 5 (%)	92 +/- 5 (%)	3
FXH394	73.1 +/- 1.9 (% w/w)	87.6 +/- 2.3 (% w/w)	

TABLE 1

<b>WebCode</b>	<b>Item 1</b>	<b>Item 2</b>	<b>Coverage factor k</b>
<b>Preparation concentration:</b>	<b>75%</b>	<b>90%</b>	
FYDLB6	59.2 +/- 3.7 (%)	71.3 +/- 4.4 (%)	3
GYAKNA	79 +/- 7 (%)	96 +/- 7 (%)	2
GZ64PC	76.3 +/- 5.0 (%)	90.0 +/- 5.0 (%)	2
HPMMW6	75.9 +/- 4.9 (%)	93.0 +/- 6.0 (%)	2
JCTP9C	74.6% +/- 1.9 (wgt/vol)	90.15 +/- 2.2 (wgt/vol)	
JUR3JX	728 +/- 7 (mg/g)	851 +/- 17 (mg/g)	
KVYHQ4	75.7 +/- 4.9 (%)	91.5 +/- 5.9 (%)	2
KZAV83	73.6 +/- 4.7 (%)	89.6 +/- 5.8 (%)	2
L8B84Z	75.0 +/- 3.2 (%)	90.8 +/- 3.2 (%)	2.3
LAE3M3	74.3 +/- 4.8 (%)	91.4 +/- 5.9 (%)	2
LKVL8Y	73 +/- 4 (%)	90 +/- 4 (%)	2
LM42E6	75 +/- 11 (%)	95 +/- 14 (%)	3
M6YRAY	76.4 +/- 5.5 (%)	91.4 +/- 6.8 (%)	2.571
MDB6RU	75.3 +/- 2.1 (%)	91.2 +/- 2.1 (%)	1.05927
MLL8DV	71.23 (%)	91.68 (%)	
MRDEW4	75.3 +/- 2.6 (%)	90.0 +/- 3.1 (%)	
P9QXGZ	77.3 +/- 5.0 (%)	90.9 +/- 5.0 (%)	2
PMCKKZ	69 +/- 6 (%)	83 +/- 7 (%)	2.65
Q29NT4	74.5 +/- 2.3 (%)	91.4 +/- 2.8 (%)	2

TABLE 1

<b>WebCode</b>	<b>Item 1</b>	<b>Item 2</b>	<b>Coverage factor</b>
<b>Preparation concentration:</b>	<b>75%</b>	<b>90%</b>	<b>k</b>
RJ29MT	71 +/- 2.7 (% as salt form)	87 +/- 2.7 (% as salt form)	2
RRD9G6	70.05 +/- 4.90 (%)	83.88 +/- 5.87 (%)	2
TNBM6R	75.3 +/- 7.57 (%)	93.4 +/- 9.3 (%)	
TRCV93	72 +/- 16 (%)	88 +/- 9.2 (%)	3
UEG2CY	79.5 +/- 2.4 (%)	97.0 +/- 3.0 (%)	2
UTHD8X	74.0 +/- 3.3 (%)	89.8 +/- 3.3 (%)	3
VPX8NT	77.76 +/- 7.90 (%)	94.71 +/- 7.90 (%)	2
VUCH2X	73 +/- 5 (%)	86 +/- 5 (%)	2.06
WMKUJW	74.9 +/- 5.0 (%)	90.1 +/- 5.0 (%)	2
XNBFPT	77 +/- 12 (%)	99 +/- 15 (%)	3
YDTV6W	77,3 +/- 3,1 (%)	92,9 +/- 3,7 (%)	95%
YEPE8X	74 +/- 17 (%)	90 +/- 9.2 (%)	3
YY9G3W	73 +/- 17 (%)	89 +/- 9.2 (%)	3

# Reporting Procedures

TABLE 2

<b>WebCode</b>	<b>Reporting Procedures</b>
27N2ZU	The mean of duplicate/several determinations.
2DH44Q	The mean of duplicate/several determinations.
2EDL6R	The mean of duplicate/several determinations.
2GK44M	The mean of duplicate/several determinations.
2QBPAL	Mean of quadruplicate/several determinations
33JR9N	The mean of duplicate/several determinations.
3LRV7T	The mean of duplicate/several determinations.
3WDYET	The mean of duplicate/several determinations.
4JH3RK	single determination
4KT4DJ	The mean of duplicate/several determinations.
4U47YK	The mean of duplicate/several determinations.
6AR4EK	The mean of duplicate/several determinations.
6BMLFL	The mean of duplicate/several determinations.
6K9MXG	The mean of duplicate/several determinations.
7BHNGK	The mean of duplicate/several determinations.
7CYHKQ	The mean of duplicate/several determinations.
7FAV3P	The mean of duplicate/several determinations.
7MB8YM	The mean of duplicate/several determinations.
7W2T6K	The mean of duplicate/several determinations.
838MYF	The mean of duplicate/several determinations.
87GZGE	Single Event UV Quant
8BCUEF	Single Event UV Quant
93L99H	The mean of duplicate/several determinations.
A2KVZF	The mean of duplicate/several determinations.
ADCG7B	The mean of duplicate/several determinations.



TABLE 2

<b>WebCode</b>	<b>Reporting Procedures</b>
BAUL4H	The mean of duplicate/several determinations.
C8KUNB	The mean of duplicate/several determinations.
D8EYHA	Single event
DJ9F8B	single event UV quant
DTY2D9	The mean of duplicate/several determinations.
DXTVBA	The mean of duplicate/several determinations.
DY2AHF	The mean of duplicate/several (3) determinations.
EJ3K2A	single point UV quantitation
F92J2B	The mean of duplicate/several determinations.
FETNUE	single analysis run after a triplicate check sample run
FUJRD4	The mean of duplicate/several determinations.
FXH394	The mean of duplicate determinations
FYDLB6	The mean of duplicate/several determinations.
GYAKNA	The mean of duplicate/several determinations.
GZ64PC	The mean of duplicate/several determinations.
HPMMW6	Single determination
JCTP9C	The mean of duplicate/several determinations.
JUR3JX	The mean of duplicate/several determinations.
KVYHQ4	single determination
KZAV83	Single event UV quant
L8B84Z	The mean of duplicate/several determinations.
LAE3M3	Single event UV quantitation
LKVL8Y	The mean of duplicate/several determinations.
LM42E6	The mean of duplicate/several determinations.
M6YRAY	The mean of duplicate/several determinations.
MDB6RU	The mean of duplicate/several determinations.

TABLE 2

<b>WebCode</b>	<b>Reporting Procedures</b>
MLL8DV	The mean of duplicate/several determinations.
MRDEW4	The mean of duplicate/several determinations.
P9QXGZ	The mean of duplicate/several determinations.
PMCKKZ	The mean of duplicate/several determinations.
Q29NT4	The mean of duplicate/several determinations.
RJ29MT	The mean of duplicate/several determinations.
RRD9G6	The mean of duplicate/several determinations.
TNBM6R	The mean of duplicate/several determinations.
TRCV93	The mean of duplicate/several determinations.
UEG2CY	The mean of duplicate/several determinations.
UTHD8X	The mean of duplicate/several determinations.
VPX8NT	The mean of duplicate/several determinations.
VUCH2X	The lowest value of duplicate/several determinations.
WMKUJW	The mean of duplicate/several determinations.
XNBFPT	The mean of duplicate/several determinations.
YDTV6W	The mean of duplicate/several determinations.
YEPE8X	The mean of duplicate/several determinations.
YY9G3W	The mean of several determinations, rounded down to the whole number.

<b>Response Summary</b>		<b>Participants: 69</b>
The mean of duplicate/several determinations:	<b>53</b>	(76.8%)
The lowest value of duplicate/several determinations:	<b>1</b>	(1.4%)
Other:	<b>15</b>	(21.7%)

**Raw Data***List of raw data determinations in percent.*

TABLE 3 - Item 1

<b>WebCode</b>	<b>Item 1</b>		<b>Preparation target concentration : 75%</b>						<b>Mean</b>
27N2ZU	78.00	80.30							79.15
2DH44Q									
2EDL6R	75.10	74.70	73.30						74.37
2GK44M	75.58	74.99	75.03	75.27	74.85	75.37			75.18
2QBPAL	67.28	65.98	64.99	67.53					66.45
33JR9N	72.35	72.35	72.27	72.11	72.09	71.92	71.74	71.65	72.06
3LRV7T	74.73	76.96							75.85
3WDYET	73.60	76.73							75.17
4JH3RK	75.40								75.40
4KT4DJ	75.67	75.98	77.08	77.35					76.52
4U47YK	71.92	71.13	73.40	73.81					72.57
6AR4EK	75.95	77.66	76.36						76.66
6BMLFL	81.63	80.59							81.11
6K9MXG	77.58	73.63							75.61
7BHNGK	72.61	72.41	72.54	72.83	72.78	72.29	73.37	73.18	73.00
	73.56	73.45	73.34	73.67					
7CYHKQ	74.50	74.10							74.30
7FAV3P	74.80	73.90							74.35
7MB8YM	74.40	73.20	71.20						72.93
7W2T6K	76.75	76.52	76.84	76.66	79.08	80.28			77.69
838MYF	70.20	69.30	67.90	66.30					68.43
87GZGE	78.70								78.70
8BCUEF	75.40								75.40
93L99H	73.25	74.55	74.84	74.35	74.32	73.79			74.18
A2KVZF	76.54	76.63	76.65	76.51	76.22				76.51
ADCG7B	72.15	71.75	73.00	73.04					72.49
BAUL4H	78.50	74.60	70.00						74.37
C8KUNB	79.38	86.46							82.92
D8EYHA	75.40								75.40
DJ9F8B	76.80								76.80
DTY2D9	70.60	70.60							70.60

TABLE 3 - Item 1

<b>WebCode</b>	<b>Item 1</b>		<b>Preparation target concentration : 75%</b>				<b>Mean</b>
DXTVBA	68.61	68.97	68.98	68.42			68.75
DY2AHF	76.28	69.95	72.93				73.05
EJ3K2A	75.90						75.90
F92J2B	75.71	74.89	75.71				75.44
FETNUE	72.20						72.20
FUJRD4	72.21	74.77					73.49
FXH394	73.50	72.60					73.05
FYDLB6	58.90	59.50					59.20 X
GYAKNA	79.37	79.26	80.71				79.78
GZ64PC	77.20	76.30	75.40				76.30
HPMMW6	75.90						75.90
JCTP9C	74.95	74.29					74.62
JUR3JX	73.50	73.10	72.20	72.70	72.70		72.84
KVYHQ4	75.70						75.70
KZAV83	73.60						73.60
L8B84Z	74.90	75.09					75.00
LAE3M3	74.30						74.30
LKVL8Y	73.77	73.77	72.09	72.14			72.94
LM42E6	74.84	74.32					74.58
M6YRAY	77.73	76.09	76.51	75.82	75.96	76.45	76.43
MDB6RU	75.37	75.70	75.05	75.37			75.37
MLL8DV	69.40	71.20	73.10				71.23
MRDEW4	74.60	74.10	76.50	75.90			75.28
P9QXGZ	80.10	79.40	72.60				77.37
PMCKZ	69.33	68.18	69.09	70.08	70.03	68.27	69.16
Q29NT4	73.70	75.20					74.45
RJ29MT	56.25	57.37					56.81 X
RRD9G6	69.45	70.65					70.05
TNBM6R	75.33						75.33
TRCV93	71.93	72.02					71.98
UEG2CY	80.90	78.10					79.50
UTHD8X							

TABLE 3 - Item 1

<b>WebCode</b>	<b>Item 1</b>		<b>Preparation target concentration : 75%</b>				<b>Mean</b>
VPX8NT	77.35	77.87	78.08				77.77
VUCH2X	73.90	74.20	74.60	74.10	73.50	73.30	73.93
WMKUJW	74.80	76.10	73.80				74.90
XNBFPT	77.62	75.47					76.55
YDTV6W	77.10	77.50					77.30
YEPE8X	74.57	75.10					74.84
YY9G3W	73.70	74.10					73.90

**Statistical Analysis for Item 1**

Grand Mean	74.72	Number of Participants Included	65	Number of Participants without Raw Data or Data that was not reported in %	2
Standard Deviation	2.894	Number of Participants Excluded	2		

TABLE 3 - Item 2

<b>WebCode</b>	<b>Item 2</b>		<b>Preparation target concentration : 90%</b>						<b>Mean</b>
27N2ZU	92.50	92.00							92.25
2DH44Q									
2EDL6R	87.50	89.60	89.90						89.00
2GK44M	90.14	88.98	90.11	91.20	89.49	90.95			90.15
2QBPAL	84.56	84.94	86.39	87.73					85.91
33JR9N	90.73	90.55	90.54	90.16	90.47	90.40	90.18	90.15	90.40
3LRV7T	90.99	90.43							90.71
3WDYET	91.19	91.55							91.37
4JH3RK	92.00								92.00
4KT4DJ	93.91	93.98	91.43	91.61					92.73
4U47YK	89.94	90.02	89.87	90.00					89.96
6AR4EK	93.67	92.64	95.72						94.01
6BMLFL	93.37	96.82							95.10
6K9MXG	87.35	92.29							89.82
7BHNLG	90.06	89.75	90.19	89.89	89.95	89.86	89.47	88.84	89.53
	89.03	89.44	89.06	88.79					
7CYHKQ	91.90	91.20							91.55
7FAV3P	89.20	89.50							89.35
7MB8YM	87.90	90.10	90.00						89.33
7W2T6K	92.24	91.61	92.48	91.76	94.12	93.11			92.55
838MYF	89.00	86.40	89.00	87.70					88.03
87GZGE	93.50								93.50
8BCUEF	91.40								91.40
93L99H	89.44	89.05	88.88	89.32	89.84	91.46			89.67
A2KVZF	92.87	93.20	92.47	92.49					92.76
ADCG7B	86.28	85.69	85.83	85.74					85.89
BAUL4H	91.10	87.10	92.30						90.17
C8KUNB	99.32	106.06							102.69 X
D8EYHA	89.90								89.90
DJ9F8B	91.30								91.30
DTY2D9	88.20	88.90							88.55
DXTVBA	89.18	89.38	90.22	88.07					89.21
DY2AHF	80.67	84.47	83.45						82.86

TABLE 3 - Item 2

<b>WebCode</b>	<b>Item 2</b>	<b>Preparation target concentration : 90%</b>					<b>Mean</b>
EJ3K2A	92.20						92.20
F92J2B	90.24	90.91	89.38				90.18
FETNUE	90.50						90.50
FUJRD4	93.24	90.73					91.99
FXH394	88.00	87.10					87.55
FYDLB6	72.30	70.20					71.25 X
GYAKNA	96.59	97.06	96.87				96.84
GZ64PC	92.20	92.00	85.90				90.03
HPMMW6	93.00						93.00
JCTP9C	89.07	91.23					90.15
JUR3JX	84.50	86.10	85.90	83.80			85.08
KVYHQ4	91.50						91.50
KZAV83	89.60						89.60
L8B84Z	90.16	91.53					90.85
LAE3M3	91.40						91.40
LKVL8Y	89.31	89.26	90.61	90.45			89.91
LM42E6	95.81	94.70					95.26
M6YRAY	91.73	90.84	93.47	90.81	91.04	90.60	91.42
MDB6RU	93.05	91.39	90.25	90.39			91.27
MLL8DV	90.29	91.18	90.88	93.85	92.18		91.68
MRDEW4	91.30	91.40	89.10	88.10			89.98
P9QXGZ	94.10	92.70	85.90				90.90
PMCKZ	83.06	82.59	82.57	82.16	84.63	83.22	83.04
Q29NT4	91.00	91.80					91.40
RJ29MT	69.99	69.48					69.74 X
RRD9G6	83.36	84.39					83.88
TNBM6R	93.45						93.45
TRCV93	88.55	88.54					88.55
UEG2CY	97.80	96.20					97.00
UTHD8X							
VPX8NT	94.23	95.70	94.20				94.71
VUCH2X	88.30	86.60	86.20	89.80	89.20	88.60	88.12

TABLE 3 - Item 2

<b>WebCode</b>	<b>Item 2</b>	<b>Preparation target concentration : 90%</b>		<b>Mean</b>
WMKUJW	91.20	85.90	93.20	90.10
XNBFPT	98.03	99.35		98.69
YDTV6W	93.20	92.70		92.95
YEPE8X	90.74	90.27		90.51
YY9G3W	90.20	89.60		89.90

**Statistical Analysis for Item 2**

Grand Mean	90.66	Number of Participants Included	64	Number of Participants without Raw Data or Data that was not reported in %	2
Standard Deviation	2.969	Number of Participants Excluded	3		



TABLE 3 - Response Summary

<b>Response Summary</b>	<b>Item 1</b>	<b>Item 2</b>
<b>Preparation concentration:</b>	<b>75%</b>	<b>90%</b>
Grand Mean	74.72	90.66
Standard Deviation	2.894	2.969

# Method of Analysis

TABLE 4

Method of Analysis

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
27N2ZU		✓						
2DH44Q	✓							
2EDL6R							✓	
2GK44M							✓	
2QBPAL				✓				
33JR9N								NMR
3LRV7T							✓	
3WDYET								quantitative proton NMR
4JH3RK						✓		
4KT4DJ		✓						
4U47YK		✓						
6AR4EK				✓				
6BMLFL			✓				✓	
6K9MXG								HPLC
7BHNGK							✓	
7CYHKQ							✓	
7FAV3P							✓	
7MB8YM							✓	
7W2T6K		✓					✓	
838MYF				✓				
87GZGE						✓		
8BCUEF						✓		
93L99H				✓				
A2KVZF								NMR
ADCG7B		✓						
BAUL4H							✓	

TABLE 4

## Method of Analysis

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
C8KUNB		✓						
D8EYHA						✓		
DJ9F8B						✓		Weight determination
DTY2D9						✓		
DXTVBA				✓				
DY2AHF					✓			
EJ3K2A						✓		
F92J2B						✓		
FETNUE							✓	
FUJRD4								HPLC
FXH394							✓	
FYDLB6							✓	
GYAKNA							✓	
GZ64PC							✓	
HPMMW6						✓		
JCTP9C		✓						
JUR3JX						✓		
KVYHQ4						✓		
KZAV83						✓		Weight determination
L8B84Z	✓						✓	
LAE3M3						✓		
LKVL8Y		✓						
LM42E6			✓				✓	
M6YRAY		✓						
MDB6RU							✓	
MLL8DV							✓	
MRDEW4							✓	

TABLE 4

## Method of Analysis

WebCode	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	Other
P9QXGZ							✓	
PMCKZ							✓	
Q29NT4							✓	
RJ29MT		✓						
RRD9G6				✓				
TNBM6R							✓	
TRCV93							✓	
UEG2CY							✓	
UTHD8X	✓							
VPX8NT				✓				
VUCH2X							✓	
WMKUJW							✓	
XNBFPT			✓				✓	
YDTV6W							✓	
YEPE8X							✓	
YY9G3W							✓	
Response Summary								
Participants	GC	LC	FTIR	GC/MS	LC/MS	UV	GC/FID	
	3	10	3	7	1	13	32	
Percent	4.3%	14.5%	4.3%	10.1%	1.4%	18.8%	46.4%	

# Additional Comments

TABLE 5

WebCode	Additional Comments
27N2ZU	GCMS used to confirm id, LC used for quantitation
7BHNKG	For each item, 2 weighings are done, and solutions prepared. From each solution prepared, 2 gc vials are made and injected in triplicate. Thus, for each item we have 12 raw data values. Dimethyl sulfone was identified in both samples.
7MB8YM	UV-Vis used to validate reference material.
7W2T6K	The purity of standard was 100 %. In point 2) [Table 3 - Raw Data] first three raw data determinations for item 1 (76,75 %; 76,52 %; 76,84 %) and item 2 (92,24 %; 91,61 %; 92,48 %) were measure by LC method. The second three raw data determinations for item 1 (76,66 %; 79,08 %; 80,28 %) and item 2 (91,76 %; 94,12 %; 93,11 %) were measure by GC/FID method.
87GZGE	Weight Determination, FTIR, GC/MS
8BCUEF	Weight determination, FTIR, GC/MS
A2KVZF	CTS should consider the use of non-volatile diluents for future quant samples.
DJ9F8B	ran an IR, GC/MS, did a Marquis, and a thin-layer on both samples
FXH394	In routine practice concentration (% purity) is calculated based on methamphetamine base, and in the case report the weight of methamphetamine base for the whole sample was reported, not the concentration. [From Table 3 - Raw Data - Item 1: "GC FID reading (mg/mL) x volume (mL) / weight of sample taken (mg) x 100%. i) $0.5005 \times 25 / 21.2 \times 100\% = 59.02\%$ (meth base). $59.02 \times 100 / 80.3 = 73.5\%$ (methamphetamine HCl). ii) $0.4923 \times 25 / 21.1 \times 100\% = 58.32\%$ (meth base). $58.32 \times 100 / 80.3 = 72.6\%$ (methamphetamine HCl)."] [From Table 3 - Raw Data - Item 2: "GC FID reading (mg/mL) x volume (mL) / weight of sample taken (mg) x 100%. i) $0.6109 \times 25 / 21.6 \times 100\% = 70.70\%$ (meth base). $70.70 \times 100 / 80.3 = 88.0\%$ (methamphetamine HCl). ii) $0.5931 \times 25 / 21.2 \times 100\% = 69.94\%$ . $69.94 \times 100 / 80.3 = 87.1\%$ (methamphetamine HCl).
GZ64PC	UV-Vis was used to validate reference material.
KZAV83	Additional tests for qualitative analysis: FTIR, GC/MS, Spot Testing (Marquis and Sodium Nitroprusside)
MLL8DV	Item 1 quantitation is based on 3 replicates. Item 2 quantitation is based on 5 replicates. Measurement uncertainty has not been implemented.
MRDEW4	Solvent used : methanol
P9QXGZ	UV to confirm only
RJ29MT	Raw data determinations have been determined as methamphetamine in base form. The concentration of methamphetamine HCl has been calculated in the salt form.
WMKUJW	1. UV-Vis was used to validate reference material.
YY9G3W	Each percentage listed above was determined using the average of duplicate GC-FID runs (peak area). Two dilutions per item were made and used for quantitative analysis.

# Appendix: Data Sheet

Collaborative Testing Services ~ Forensic Testing Program

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## Test No. 16-505: Quantitative Drug Analysis

DATA MUST BE RECEIVED BY June 27, 2016 TO BE INCLUDED IN THE REPORT

Participant Code:

WebCode:

### Accreditation Release Statement

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and 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 on the last page must be completed and submitted.)

This participant's data is NOT intended for submission to ASCLD/LAB, ANAB or A2LA.

**Scenario:**

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

**Note:**

-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 Methamphetamine HCl present in the samples.

**Items Submitted (Sample Pack DQT):**

Items 1 & 2: Powdered Methamphetamine HCl samples

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

	<u>Reported Concentration</u>		<u>Uncertainty (k= _____ )</u>	<u>Units</u>
<b>Item 1:</b>		±		(            )
<b>Item 2:</b>		±		(            )

**1b.) Are the values listed above:**

The mean of duplicate / several determinations?  The lowest value of duplicate / several determinations?

Other? (Specify): \_\_\_\_\_

**Please return all pages of this data sheet.**

Participant Code:

WebCode:

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

Item 1 (%)		Item 2 (%)	
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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

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

**4.) Additional Comments**

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**Please return all pages of this data sheet.**

Participant Code:

WebCode:

**5.) DRUG QUANTITATION SURVEY**

CTS is committed to finding new ways to meet your proficiency testing needs. Please provide information below on the drugs **most commonly encountered** in your quantitative casework including the drug name, common concentration range, typical number of cases per year, and common diluents.

(Example: Methamphetamine, 70-90% concentration, 10 cases per year, diluents- lactose, caffeine.)

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<p><b>Return Instructions:</b> Data must be received via online data entry, fax (please include a cover sheet), or mail by <u>June 27, 2016</u> to be included in the report. Emailed data sheets are not accepted.</p> <p>QUESTIONS?          TEL: +1-571-434-1925 (8 am - 4:30 pm EST)          EMAIL: <a href="mailto:forensics@cts-interlab.com">forensics@cts-interlab.com</a>  <a href="http://www.ctsforensics.com">www.ctsforensics.com</a></p>	<p>Participant Code:          ONLINE DATA ENTRY: <a href="http://www.cts-portal.com">www.cts-portal.com</a>          FAX: +1-571-434-1937          MAIL: Collaborative Testing Services, Inc.          P.O. Box 650820          Sterling, VA 20165-0820 USA</p>
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**Please return all pages of this data sheet.**



Collaborative Testing Services ~ Forensic Testing Program

**RELEASE OF DATA TO ACCREDITATION BODIES**

The following Accreditation Releases will apply only to:

Participant Code: \_\_\_\_\_ WebCode: \_\_\_\_\_

for Test No. **16-505: Quantitative Drug Analysis**

This release page must be completed and received by June 27, 2016 to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

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**

ASCLD/LAB Certificate No. \_\_\_\_\_

ANAB Certificate No. \_\_\_\_\_

A2LA Certificate No. \_\_\_\_\_

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

Signature and Title \_\_\_\_\_

Laboratory Name \_\_\_\_\_

Location (City/State) \_\_\_\_\_

**Return Instructions**

**Accreditation Release**

*Please submit the completed Accreditation Release at the same time as your full data sheet. See Data Sheet Return Instructions on the previous page.*

*Questions? Contact us 8 am-4:30 pm EST  
Telephone: +1-571-434-1925  
email: forensics@cts-interlab.com*

**Please return all pages of this data sheet.**

Page 4 of 4

# Supplemental: Bivariate Control Analysis

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 measurands are similar, there should be a correlation of measurement performance between the two samples. A bi-variate 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. An ellipse is drawn so that 95% of the time a randomly selected laboratory will be included inside.

When considering your lab's position on the plot relative to the ellipse, remember that, generally speaking, if a lab's plotted point falls on the major axis outside of the ellipse, the lab is consistent in its measurements between the two samples but exhibits an offset from the grand mean (systematic bias). If a plotted point falls to the side of the ellipse, it indicates possible differences in the way that the lab tested the two samples or differences in sample behavior (inconsistency in testing).

### Systematic Bias

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. Bias is an inherent component of laboratory measurement. When these differences become too large, a laboratory may receive a Data Flag. When the test results for both samples are both high or low compared to the group, a laboratory 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.

### Inconsistency in Testing

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 other testing conditions. The inconsistency is reflected in the Comparative Performance Values for the two samples, such as a +1.5 CPV for Item 1 and a -2.2 CPV for Item 2.

### Definition of Terms

<b>Participant Mean</b>	The average of the test results obtained by a participant.
<b>Grand Mean</b>	The average of all included participant means. Participants flagged with an X are excluded from the grand mean.
<b>Comparative Performance Value</b>	An indication of how well a participant's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the grand mean. The closer a laboratory's CPV is to zero, the more consistent its results are with the other participants' data (and vice versa).
<b>Data Flag</b>	Data flags are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol.

<u>Data Flag</u>	<u>Statistically Included/Excluded</u>	<u>Explanation</u>
*	Included	Results fall outside 95% ellipse, but within a 99% ellipse that is calculated but not drawn
X	Excluded	Results fall outside of 99% ellipse.
M	Excluded	Laboratory did not report data for one or more Items.

## Bivariate Control Analysis

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
27N2ZU		79.15	4.563	1.66	92.25	1.590	0.60
2DH44Q	M						
2EDL6R		74.37	-0.220	-0.08	89.00	-1.660	-0.63
2GK44M		75.18	0.595	0.22	90.15	-0.515	-0.19
2QBPAL	*	66.45	-8.142	-2.96	85.91	-4.755	-1.79
33JR9N		72.06	-2.526	-0.92	90.40	-0.262	-0.10
3LRV7T		75.85	1.258	0.46	90.71	0.050	0.02
3WDYET		75.17	0.578	0.21	91.37	0.710	0.27
4JH3RK		75.40	0.813	0.30	92.00	1.340	0.50
4KT4DJ		76.52	1.933	0.70	92.73	2.073	0.78
4U47YK		72.57	-2.022	-0.73	89.96	-0.702	-0.26
6AR4EK		76.66	2.070	0.75	94.01	3.350	1.26
6BMLFL		81.11	6.523	2.37	95.10	4.435	1.67
6K9MXG		75.61	1.020	0.37	89.82	-0.836	-0.31
7BHNLG		73.00	-1.586	-0.58	89.53	-1.132	-0.43
7CYHKQ		74.30	-0.287	-0.10	91.55	0.890	0.34
7FAV3P		74.35	-0.237	-0.09	89.35	-1.310	-0.49
7MB8YM		72.93	-1.653	-0.60	89.33	-1.327	-0.50
7W2T6K		77.69	3.102	1.13	92.55	1.893	0.71
838MYF		68.43	-6.162	-2.24	88.03	-2.635	-0.99
87GZGE		78.70	4.113	1.50	93.50	2.840	1.07
8BCUEF		75.40	0.813	0.30	91.40	0.740	0.28
93L99H		74.18	-0.403	-0.15	89.67	-0.995	-0.37
A2KVZF		76.51	1.922	0.70	92.76	2.097	0.79
ADCG7B		72.49	-2.102	-0.76	85.89	-4.775	-1.80
BAUL4H		74.37	-0.220	-0.08	90.17	-0.493	-0.19
C8KUNB	X	82.92	8.333	3.03	102.7	12.030	4.53
D8EYHA		75.40	0.813	0.30	89.90	-0.760	-0.29
DJ9F8B		76.80	2.213	0.80	91.30	0.640	0.24
DTY2D9		70.60	-3.987	-1.45	88.55	-2.110	-0.79
DXTVBA	*	68.75	-5.842	-2.12	89.21	-1.447	-0.55

# Bivariate Control Analysis

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
DY2AHF	X	73.05	-1.533	-0.56	82.86	-7.797	-2.94
EJ3K2A		75.90	1.313	0.48	92.20	1.540	0.58
F92J2B		75.44	0.851	0.31	90.18	-0.483	-0.18
FETNUE		72.20	-2.387	-0.87	90.50	-0.160	-0.06
FUJRD4		73.49	-1.099	-0.40	91.99	1.325	0.50
FXH394		73.05	-1.537	-0.56	87.55	-3.110	-1.17
FYDLB6	X	59.20	-15.387	-5.59	71.25	-19.410	-7.31
GYAKNA		79.78	5.191	1.89	96.84	6.181	2.33
GZ64PC		76.30	1.713	0.62	90.03	-0.627	-0.24
HPMMW6		75.90	1.313	0.48	93.00	2.340	0.88
JCTP9C		74.62	0.033	0.01	90.15	-0.510	-0.19
JUR3JX	*	72.84	-1.747	-0.63	85.08	-5.585	-2.10
KVYHQ4		75.70	1.113	0.40	91.50	0.840	0.32
KZAV83		73.60	-0.987	-0.36	89.60	-1.060	-0.40
L8B84Z		75.00	0.408	0.15	90.85	0.185	0.07
LAE3M3		74.30	-0.287	-0.10	91.40	0.740	0.28
LKVL8Y		72.94	-1.644	-0.60	89.91	-0.752	-0.28
LM42E6	*	74.58	-0.007	0.00	95.26	4.595	1.73
M6YRAY		76.43	1.840	0.67	91.42	0.755	0.28
MDB6RU		75.37	0.787	0.29	91.27	0.610	0.23
MLL8DV		71.23	-3.353	-1.22	91.68	1.016	0.38
MRDEW4		75.28	0.688	0.25	89.98	-0.685	-0.26
P9QXGZ		77.37	2.780	1.01	90.90	0.240	0.09
PMCKZ	*	69.16	-5.423	-1.97	83.04	-7.622	-2.87
Q29NT4		74.45	-0.137	-0.05	91.40	0.740	0.28
RJ29MT	X	56.81	-17.777	-6.46	69.74	-20.925	-7.88
RRD9G6	*	70.05	-4.537	-1.65	83.88	-6.785	-2.56
TNBM6R		75.33	0.743	0.27	93.45	2.790	1.05
TRCV93		71.98	-2.612	-0.95	88.55	-2.115	-0.80
UEG2CY		79.50	4.913	1.79	97.00	6.340	2.39
UTHD8X	M						

## Bivariate Control Analysis

WebCode	Data Flag	Item 1			Item 2		
		Participant Mean	Difference from Grand Mean	CPV	Participant Mean	Difference from Grand Mean	CPV
VPX8NT		77.77	3.180	1.16	94.71	4.050	1.53
VUCH2X		73.93	-0.653	-0.24	88.12	-2.543	-0.96
WMKUJW		74.90	0.313	0.11	90.10	-0.560	-0.21
XNBFPT	X	76.55	1.958	0.71	98.69	8.030	3.02
YDTV6W		77.30	2.713	0.99	92.95	2.290	0.86
YEPE8X		74.84	0.248	0.09	90.51	-0.155	-0.06
YY9G3W		73.90	-0.687	-0.25	89.90	-0.760	-0.29

Response Summary	Item 1	Item 2
<b>Preparation Concentration</b>	<b>75%</b>	<b>90%</b>
Grand Mean	74.59	90.66
Standard Deviation	2.751	2.655
Number of Participants Included: 62	Number of Participants Excluded: 7	

# Bivariate Control Analysis

Item 1 Grand Mean : 74.59

Item 2 Grand Mean: 90.66

