

Pipette Calibration Services, Inc.
 150 Wells Ave
 Newton, MA 02459
 Tel: (866)964-0039

Abc, Inc.
 1 Medical Center Drive
 Lebanon, NH 03756

Calibrated at: Client Site
 Recal. Due: Jun/30/2018
 Make: Rainin
 Model: L-200 ul 8 ch XLS
 Serial Number: B648362362
 Id Marks:
 Tracking Number: 408102.0108

Level 4 Calibration Report

ISO/IEC 17025:2005 Accredited
 Accreditation #63119



Calibrated By:	Shanjun Zhang	As Found	Shanjun Zhang	As Left	Shanjun Zhang
Cal. Date:	Jun/01/2017	Standard:	METTLER MCP1-S	METTLER MCP1-S	
Balance SN:	1124016422	Balance Recal Due:	Apr/30/2018	Apr/30/2018	
Weight Set:	84359	Wt.Recal Due:	Dec/31/2017	Dec/31/2017	
Env. Logger ID:	OM02	Humidity %RH:	30.8	23.8	Evap Trap in Use (> 50%)
Logger Recal Due:	Jan/31/2018	Barometer mm. Hg:	762.71	760.17	
Air/Water Temp(C):	24.3 / 23.7	Water Den. (g/ml):	0.99633	0.99705	
Z factor (1/density):	1.00368			1.00296	

As Found 20 ul										
Repetition (mg)	1	2	3	4	5	6	7	8		
1	19.8	19.8	19.7	19.7	19.8	19.8	19.8	19.8		
2	19.8	19.8	19.9	19.9	19.8	19.9	20.0	19.8		
3	19.7	19.9	19.7	19.7	19.8	19.8	19.7	19.9		
4	19.8	19.9	19.7	19.9	19.9	19.9	20.0	19.8		
Average(ul)	19.8	19.9	19.8	19.9	19.9	20.0	19.9	19.9		19.9
Inaccuracy(%)	0.76	0.38	1.01	0.64	0.51	0.13	0.26	0.38		0.51
Imprecision(%CV)	0.25	0.29	0.25	0.58	0.25	0.41	0.75	0.29		0.46
Accuracy	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Precision	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Uncertainty(k=2)ul	0.20	0.20	0.20	0.22	0.20	0.21	0.24	0.20		
As Found 200 ul										
Repetition (mg)	1	2	3	4	5	6	7	8		
1	198.7	198.5	198.5	198.6	198.6	198.6	198.4	198.7		
2	198.7	198.6	198.0	198.4	198.6	198.6	198.6	198.7		
3	198.6	198.6	198.5	198.7	198.7	198.7	198.8	198.7		
4	198.6	198.5	198.4	198.5	198.5	198.5	198.5	198.5		
Average(ul)	199.4	199.3	199.1	199.3	199.4	199.4	199.4	199.4		199.3
Inaccuracy(%)	0.28	0.36	0.46	0.36	0.31	0.32	0.31	0.28		0.34
Imprecision(%CV)	0.04	0.03	0.12	0.06	0.06	0.06	0.13	0.08		0.09
Accuracy	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Precision	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Uncertainty(k=2)ul	0.59	0.59	0.63	0.60	0.60	0.60	0.64	0.61		
As Left 20 ul										
Repetition (mg)	1	2	3	4	5	6	7	8		
1	19.9	20.0	20.0	20.1	20.1	20.1	20.1	20.0		
2	20.2	20.2	20.1	20.3	20.2	20.2	20.3	20.2		
3	20.2	20.3	20.3	20.3	20.3	20.3	20.2	20.1		
4	20.0	20.2	20.2	20.2	20.2	20.2	20.2	20.2		
Average(ul)	20.1	20.2	20.2	20.3	20.3	20.3	20.3	20.2		20.2
Inaccuracy(%)	0.67	1.17	1.05	1.42	1.30	1.30	1.30	0.92		1.14
Imprecision(%CV)	0.74	0.62	0.64	0.47	0.40	0.40	0.40	0.47		0.52
Accuracy	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Precision	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Uncertainty(k=2)ul	0.24	0.23	0.23	0.21	0.21	0.21	0.21	0.21		
As Left 200 ul										
Repetition (mg)	1	2	3	4	5	6	7	8		
1	198.9	198.3	198.6	198.7	198.9	199.1	199.0	199.1		199.1
2	198.8	198.7	198.6	198.9	199.1	199.0	199.1	198.9		198.9
3	199.0	199.0	199.0	199.0	199.1	199.0	199.3	199.1		199.1
4	198.6	198.6	198.4	198.7	198.7	198.7	198.7	198.8		198.8
Average(ul)	199.4	199.2	199.2	199.4	199.5	199.5	199.6	199.6		199.4
Inaccuracy(%)	0.29	0.39	0.38	0.29	0.23	0.23	0.19	0.22		0.28
Imprecision(%CV)	0.09	0.13	0.13	0.08	0.10	0.09	0.13	0.08		0.11
Accuracy	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Precision	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS		PASS
Uncertainty(k=2)ul	0.61	0.63	0.64	0.60	0.61	0.61	0.63	0.60		

Manufacturer Specifications		
Volume	20 ul	200 ul
Accuracy (ul)	19.5 - 20.5	198.4 - 201.6
Precision%	1	0.15

Procedure:
 This pipette was calibrated gravimetrically using Pipette Calibration Services, Inc Standard Operating Procedures. This is to certify that the above item was calibrated using standards whose measurement results are traceable to reference standards developed and maintained by (NM) National Metrology Institutes, such as (NIST, USA) to International System of Units(SI) and/or based on fundamental physical constants. Pipette Calibration Services, Inc.'s quality management system is in compliance with ISO/IEC 17025:2005 standard. Test Uncertainty Ratio (TUR) is greater than 4:1, unless otherwise noted. This certificate and the data shall not be reproduced except in full without written approval of Pipette Calibration Services, Inc. management. Measurement results pertain only to the item calibrated and apply at the time of measurements.
 The measurement uncertainty(MU) is reported at a confidence level of at least 95%(k=2). MU associated with the measurement results reported in this certificate was not accounted for in making the decision of compliance or non-compliance with the relevant specifications identified above.
 The average(ul) and error % reported is calculated by multiplying the average weight as measured by the balance by the Z factor as shown in the standards and conditions.

Parts Replaced:
 Lubricated

Comments:

Remedial action:
 Items replaced as indicated in "Parts Replaced".



Report reviewed by: _____
 Patience Miller, Quality Assurance

Date of review: _____