

SECTION 1: NAME AND ADDRESS OF CUSTOMER

Henry Troemner LLC
201 Wolf Drive
Thorofare, NJ 08086

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Pipette Photometric

Certificate Number 19365
Date of Calibration 27-NOV-2002

SECTION 2: APPROVED SIGNATORY

Joseph Moran

SECTION 3: PERSON PERFORMING WORK

Nancy Ayala

SECTION 4: CERTIFICATE INFORMATION

Description of Pipette: MLA 50-200 UL
Manufacturer of Pipette: VISTALAB (MLA)

Order Number	: 900000	Date Received	: 27-NOV-2002
Serial Number	: 19365	Date of Calibration	: 27-NOV-2002
Balance Used	: PC53	Date of Issue	: 27-NOV-2002

SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21.40°C	Pressure: 762.35 mm Hg	Humidity: 43.00%
Air Density: 0.001198	Cubic Expansion: 0.000017	Z-Factor: 1.003130

SECTION 6: PERTINENT INFORMATION

The Pipette listed on this calibration report have been tested using the photometric system. The system is compared to the gravimetric system with reference mass standards that are directly traceable to the National Institute of Standards and Technology under Test No. 822/264157-00.

This calibration meets specifications as outlined in DIN 12650, ISO 8655, ASTM E1154, ISO 9001, ISO/IEC 17025.

The uncertainty is the error in volume due to the measurement process. Uncertainty is calculated per NIST Technical Note 1297 using a coverage factor of $k = 2$ ($k = 2$ defines an interval having a level of confidence of approximately 95 percent).

Equipment used to monitor the environmental conditions in the certification laboratory have been compared with the standards that are directly traceable to the National Institute of Standards and Technology (NIST).

The density of water is traceable to the SI units through the Jones/Harris Equation (1992, ITS-90).

Calibration Certificate

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SECTION 7: CALIBRATION DATA AS FOUND

Measurement Series 50.00 μ l

(u/l)	Channel	Sample #	Volume (μ l)
50.00	1	1	50.167
50.00	1	2	50.177
50.00	1	3	50.167
50.00	1	4	50.167

Mean Value	(\bar{x}):	50.169	μ l	Method:	Addition - Tare
Inaccuracy	(d):	0.338	%	Inaccuracy Limit:	\pm 2.00%
Imprecision	(CV):	0.010	%	Imprecision Limit:	\leq 0.67%
Uncertainty	:	0.300	μ l	Result:	PASSED

Measurement Series 125.00 μ l

(u/l)	Channel	Sample #	Volume (μ l)
125.00	1	1	125.391
125.00	1	2	125.411
125.00	1	3	125.391
125.00	1	4	125.401

Mean Value	(\bar{x}):	125.399	μ l	Method:	Addition - Tare
Inaccuracy	(d):	0.319	%	Inaccuracy Limit:	\pm 1.00%
Imprecision	(CV):	0.008	%	Imprecision Limit:	\leq 1.00%
Uncertainty	:	0.340	μ l	Result:	PASSED

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SECTION 7: CALIBRATION DATA AS FOUND

Measurement Series 200.00 μ l

(ul)	Channel	Sample #	Volume (μ l)
200.00	1	1	200.636
200.00	1	2	200.626
200.00	1	3	200.626
200.00	1	4	200.646

Mean Value	(\bar{x}):	200.634	μ l
Inaccuracy	(d):	0.317	%
Imprecision	(CV):	0.005	%
Uncertainty	:	0.500	μ l

Method:	Addition - Tare
Inaccuracy Limit:	\pm 1.00%
Imprecision Limit:	\leq 0.00%
Result:	PASSED

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SECTION 8: CALIBRATION DATA AS LEFT

Measurement Series 50.00 μ l

(μ l)	Channel	Sample #	Volume (μ l)
50.00	1	1	50.167
50.00	1	2	50.177
50.00	1	3	50.157
50.00	1	4	50.167
50.00	1	5	50.167
50.00	1	6	50.167
50.00	1	7	50.177
50.00	1	8	50.177
50.00	1	9	50.167
50.00	1	10	50.167

Mean Value	(\bar{x}):	50.169	μ l	Method:	Addition - Tare
Inaccuracy	(d):	0.337	%	Inaccuracy Limit:	\pm 2.00%
Imprecision	(CV):	0.013	%	Imprecision Limit:	\leq 0.67%
Uncertainty	:	0.300	μ l	Result:	PASSED

Measurement Series 125.00 μ l

(μ l)	Channel	Sample #	Volume (μ l)
125.00	1	1	125.391
125.00	1	2	125.411
125.00	1	3	125.411
125.00	1	4	125.401
125.00	1	5	125.401
125.00	1	6	125.401
125.00	1	7	125.401
125.00	1	8	125.391
125.00	1	9	125.411
125.00	1	10	125.401

Mean Value	(\bar{x}):	125.402	μ l	Method:	Addition - Tare
Inaccuracy	(d):	0.322	%	Inaccuracy Limit:	\pm 1.00%
Imprecision	(CV):	0.006	%	Imprecision Limit:	\leq 1.00%
Uncertainty	:	0.340	μ l	Result:	PASSED

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SECTION 8: CALIBRATION DATA AS LEFT

Measurement Series 200.00 μ l

(μ l)	Channel	Sample #	Volume (μ l)
200.00	1	1	200.626
200.00	1	2	200.626
200.00	1	3	200.636
200.00	1	4	200.646
200.00	1	5	200.626
200.00	1	6	200.646
200.00	1	7	200.636
200.00	1	8	200.636
200.00	1	9	200.626
200.00	1	10	200.656

Mean Value (\bar{x}): 200.636 μ l
 Inaccuracy (d): 0.318 %
 Imprecision (CV): 0.005 %
 Uncertainty : 0.500 μ l

Method: Addition - Tare
 Inaccuracy Limit: \pm 1.00%
 Imprecision Limit: \leq 1.00%
 Result: PASSED

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SECTION 9: PARTS

CLEANED & GREASED PISTON