

SECTION 1: NAME AND ADDRESS OF CUSTOMER

Henry Troemner LLC
201 Wolf Drive
Thorofare, NJ 08086

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Pipette Gravimetric

Certificate Number: CS 5

Date of Calibration: 12-AUG-2003

SECTION 2: APPROVED SIGNATORY

Joseph Moran

SECTION 3: PERSON PERFORMING WORK

Casey Johnson

SECTION 4: CERTIFICATE INFORMATION

Description of Pipette: NP-10 (NICHIPET ORIGINAL) 0.50-10 ul

Manufacturer of Pipette: NICHIRYO

Order Number : 9999

Date Received : 12-AUG-2003

Serial Number : A93017342

Date of Calibration : 12-AUG-2003

Balance Used : AX26

Date of Issue : 13--2003

SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 22.30°C

Pressure: 763.76 mm Hg

Humidity: 47.00%

Air Density: 0.001195

Cubic Expansion: 0.000011

Z-Factor: 1.003331

SECTION 6: PERTINENT INFORMATION

The Pipettes listed on this calibration report have been tested on balances calibrated with reference mass standards that are directly traceable to the National Institute of Standards and Technology under Test No. 822/267283-02.

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). The uncertainty associated with the measurement is not included in determining inaccuracy Pass/Fail results.

Equipment used to monitor the environmental conditions in the certification laboratory have been compared with 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 0.50 μ l

(μ l)	Channel	Sample #	Sample (mg)	Volume (μ l)
0.50	1	1	0.491	0.493
0.50	1	2	0.492	0.494
0.50	1	3	0.506	0.508
0.50	1	4	0.501	0.503
0.50	1	5	0.498	0.500
0.50	1	6	0.492	0.494
0.50	1	7	0.473	0.475
0.50	1	8	0.479	0.481
0.50	1	9	0.479	0.481
0.50	1	10	0.482	0.484

Mean Value	(\bar{x}):	0.491	μ l	Method:	Addition - Tare
Inaccuracy	(d):	-1.819	%	Inaccuracy Limit:	\pm 5.00%
Imprecision	(CV):	2.197	%	Imprecision Limit:	\leq 3.00%
Uncertainty	:	0.022	μ l	Result:	PASSED

Measurement Series 5.00 μ l

(μ l)	Channel	Sample #	Sample (mg)	Volume (μ l)
5.00	1	1	4.974	4.991
5.00	1	2	4.987	5.004
5.00	1	3	4.996	5.013
5.00	1	4	5.003	5.020
5.00	1	5	4.972	4.989
5.00	1	6	4.979	4.996
5.00	1	7	4.980	4.997
5.00	1	8	4.973	4.990
5.00	1	9	4.974	4.991
5.00	1	10	4.982	4.999

Mean Value	(\bar{x}):	4.999	μ l	Method:	Addition - Tare
Inaccuracy	(d):	-0.028	%	Inaccuracy Limit:	\pm 3.00%
Imprecision	(CV):	0.209	%	Imprecision Limit:	\leq 1.75%
Uncertainty	:	0.089	μ l	Result:	PASSED

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SECTION 7: CALIBRATION DATA AS FOUND

Measurement Series 10.00 μ l

(μ l)	Channel	Sample #	Sample (mg)	Volume (μ l)
10.00	1	1	9.995	10.028
10.00	1	2	9.965	9.998
10.00	1	3	9.947	9.980
10.00	1	4	9.978	10.011
10.00	1	5	9.957	9.990
10.00	1	6	9.999	10.032
10.00	1	7	9.978	10.011
10.00	1	8	10.027	10.060
10.00	1	9	10.011	10.044
10.00	1	10	9.997	10.030

Mean Value	(\bar{x}):	10.019	μ l
Inaccuracy	(d):	0.187	%
Imprecision	(CV):	0.249	%
Uncertainty	:	0.128	μ l

Method:	Addition - Tare
Inaccuracy Limit:	\pm 1.00%
Imprecision Limit:	\leq 0.50%
Result:	PASSED

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SECTION 8: CALIBRATION DATA AS LEFT

Measurement Series 0.50 μ l

(μ l)	Channel	Sample #	Sample (mg)	Volume (μ l)
0.50	1	1	0.491	0.493
0.50	1	2	0.492	0.494
0.50	1	3	0.506	0.508
0.50	1	4	0.501	0.503
0.50	1	5	0.498	0.500
0.50	1	6	0.492	0.494
0.50	1	7	0.473	0.475
0.50	1	8	0.479	0.481
0.50	1	9	0.479	0.481
0.50	1	10	0.482	0.484

Mean Value	(\bar{x}):	0.491	μ l
Inaccuracy	(d):	-1.819	%
Imprecision	(CV):	2.197	%
Uncertainty	:	0.022	μ l

Method:	Addition - Tare
Inaccuracy Limit:	\pm 5.00%
Imprecision Limit:	\leq 3.00%
Result:	PASSED

Measurement Series 5.00 μ l

(μ l)	Channel	Sample #	Sample (mg)	Volume (μ l)
5.00	1	1	4.963	4.980
5.00	1	2	4.963	4.980
5.00	1	3	5.000	5.017
5.00	1	4	4.959	4.976
5.00	1	5	4.974	4.991
5.00	1	6	4.961	4.978
5.00	1	7	4.975	4.992
5.00	1	8	4.973	4.990
5.00	1	9	4.993	5.010
5.00	1	10	4.970	4.987

Mean Value	(\bar{x}):	4.990	μ l
Inaccuracy	(d):	-0.207	%
Imprecision	(CV):	0.274	%
Uncertainty	:	0.089	μ l

Method:	Addition - Tare
Inaccuracy Limit:	\pm 3.00%
Imprecision Limit:	\leq 1.75%
Result:	PASSED

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SECTION 8: CALIBRATION DATA AS LEFT

Measurement Series 10.00 μ l

(μ l)	Channel	Sample #	Sample (mg)	Volume (μ l)
10.00	1	1	9.961	9.994
10.00	1	2	9.970	10.003
10.00	1	3	9.998	10.031
10.00	1	4	9.969	10.002
10.00	1	5	10.011	10.044
10.00	1	6	9.961	9.994
10.00	1	7	9.932	9.965
10.00	1	8	9.939	9.972
10.00	1	9	9.995	10.028
10.00	1	10	9.966	9.999

Mean Value	(\bar{x}):	10.003	μ l
Inaccuracy	(d):	0.034	%
Imprecision	(CV):	0.251	%
Uncertainty	:	0.128	μ l

Method:	Addition - Tare
Inaccuracy Limit:	\pm 1.00%
Imprecision Limit:	\leq 0.50%
Result:	PASSED

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SECTION 9: STANDARD INFORMATION

Balance Used	Serial Number	Cal Date	Due Date	Mass Standard	Cal Due
P2	1120062641	08/01/03	11/31/03	P001	01/31/04

SECTION 10: PARTS

CLEANED & GREASED PISTON