

## ISO/IEC 17025 Calibration Certificate

201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone: 856-686-1600 • Fax: 856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

### SECTION 1: NAME AND ADDRESS OF CUSTOMER

Troemner, LLC  
201 Wolf Drive  
Thorofare NJ 08086

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**Pipette Gravimetric**

Certificate Number: CS8

Date of Calibration: 12-MAR-2018

### SECTION 2: APPROVED SIGNATORY



Joseph Moran, Metrologist

### SECTION 3: PERSON PERFORMING WORK

Danielle Clark

### SECTION 4: CERTIFICATE INFORMATION

Description of Pipette: RAININ EDP3 100-1000UL  
Manufacturer of Pipette: TROEMNER

Order Number : 123456  
Serial Number : CS8  
Balance Used : AX205  
Work Order Number : 123456

Date Received : 27-FEB-2018  
Date of Calibration : 12-MAR-2018  
Date of Issue : N/A

### SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21.20 °C  
Air Density: 0.001186 g/cm<sup>3</sup>

Pressure: 754.65 mm Hg

Humidity: 44.00 %  
Z-Factor: 1.003050

### SECTION 6: PERTINENT INFORMATION

The Pipettes listed on this calibration report have been tested on balances calibrated with reference mass standards that are traceable to the SI through the National Institute of Standards and Technology under Test No. 822/822-275872-11.

This calibration was performed using procedure PIPE-PROC to meet the specifications as outlined in ISO 8655, ASTM E1154, and 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 traceable to the SI through the National Institute of Standards and Technology (NIST).

The density of water is determined using a silicon sphere and is traceable to the SI through NIST.

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### SECTION 7: CALIBRATION DATA AS FOUND

#### Measurement Series 100.0 µl

(µl)	Channel	Sample #	Sample (mg)	Volume (µl)
100.0	1	1	97.270	97.563
100.0	1	2	97.120	97.412
100.0	1	3	97.310	97.603
100.0	1	4	97.170	97.462
100.0	1	5	97.010	97.302
100.0	1	6	97.290	97.583
100.0	1	7	97.280	97.573
100.0	1	8	96.830	97.121
100.0	1	9	97.330	97.623
100.0	1	10	97.120	97.412

Mean Value	( $\bar{X}$ ):	97.47	µl	Method:	Addition - Tare
Inaccuracy	(d):	-2.54	%	Inaccuracy Limit:	± 99.00 %
Imprecision	(CV):	0.16	%	Imprecision Limit:	≤ 99.00 %
Uncertainty	:	0.17	µl	Result:	PASSED

#### Measurement Series 500.0 µl

(µl)	Channel	Sample #	Sample (mg)	Volume (µl)
500.0	1	1	497.220	498.716
500.0	1	2	497.030	498.525
500.0	1	3	497.030	498.525
500.0	1	4	496.830	498.324
500.0	1	5	496.790	498.284
500.0	1	6	496.960	498.455
500.0	1	7	496.520	498.014
500.0	1	8	497.130	498.625
500.0	1	9	496.550	498.044
500.0	1	10	496.580	498.074

Mean Value	( $\bar{X}$ ):	498.36	µl	Method:	Addition - Tare
Inaccuracy	(d):	-0.33	%	Inaccuracy Limit:	± 99.00 %
Imprecision	(CV):	0.05	%	Imprecision Limit:	≤ 99.00 %
Uncertainty	:	0.71	µl	Result:	PASSED

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### SECTION 7: CALIBRATION DATA AS FOUND

#### Measurement Series 1000.0 µl

(µl)	Channel	Sample #	Sample (mg)	Volume (µl)
1000.0	1	1	995.790	998.785
1000.0	1	2	995.160	998.153
1000.0	1	3	995.300	998.294
1000.0	1	4	994.810	997.802
1000.0	1	5	995.140	998.133
1000.0	1	6	995.170	998.163
1000.0	1	7	995.230	998.224
1000.0	1	8	995.530	998.525
1000.0	1	9	996.180	999.177
1000.0	1	10	995.400	998.394

Mean Value	( $\bar{X}$ ):	998.4	µl
Inaccuracy	(d):	-0.2	%
Imprecision	(CV):	0.0	%
Uncertainty	:	1.4	µl

Method:	Addition - Tare
Inaccuracy Limit:	± 99.00 %
Imprecision Limit:	≤ 99.00 %
Result:	PASSED

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### SECTION 8: CALIBRATION DATA AS LEFT

#### Measurement Series 100.0 µl

(µl)	Channel	Sample #	Sample (mg)	Volume (µl)
100.0	1	1	97.040	97.332
100.0	1	2	97.010	97.302
100.0	1	3	97.190	97.482
100.0	1	4	97.070	97.362
100.0	1	5	97.130	97.422
100.0	1	6	97.030	97.322
100.0	1	7	97.250	97.543
100.0	1	8	97.220	97.512
100.0	1	9	97.050	97.342
100.0	1	10	97.050	97.342

Mean Value	( $\bar{X}$ ):	97.40	µl	Method:	Addition - Tare
Inaccuracy	(d):	-2.60	%	Inaccuracy Limit:	± 99.00 %
Imprecision	(CV):	0.09	%	Imprecision Limit:	≤ 99.00 %
Uncertainty	:	0.17	µl	Result:	PASSED

#### Measurement Series 500.0 µl

(µl)	Channel	Sample #	Sample (mg)	Volume (µl)
500.0	1	1	495.350	496.840
500.0	1	2	495.440	496.930
500.0	1	3	495.590	497.081
500.0	1	4	495.600	497.091
500.0	1	5	495.800	497.291
500.0	1	6	495.580	497.071
500.0	1	7	495.520	497.011
500.0	1	8	495.760	497.251
500.0	1	9	495.570	497.061
500.0	1	10	495.320	496.810

Mean Value	( $\bar{X}$ ):	497.04	µl	Method:	Addition - Tare
Inaccuracy	(d):	-0.59	%	Inaccuracy Limit:	± 99.00 %
Imprecision	(CV):	0.03	%	Imprecision Limit:	≤ 99.00 %
Uncertainty	:	0.71	µl	Result:	PASSED

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**SECTION 8: CALIBRATION DATA AS LEFT**

**Measurement Series**      1000.0  $\mu$ l

( $\mu$ l)	Channel	Sample #	Sample (mg)	Volume ( $\mu$ l)
1000.0	1	1	993.260	996.248
1000.0	1	2	993.570	996.559
1000.0	1	3	993.350	996.338
1000.0	1	4	992.900	995.887
1000.0	1	5	993.960	996.950
1000.0	1	6	992.400	995.385
1000.0	1	7	992.780	995.766
1000.0	1	8	992.610	995.596
1000.0	1	9	992.590	995.576
1000.0	1	10	993.190	996.178

Mean Value	( $\bar{X}$ ):	996.0	$\mu$ l
Inaccuracy	(d):	-0.4	%
Imprecision	(CV):	0.1	%
Uncertainty	:	1.4	$\mu$ l

Method:	Addition - Tare
Inaccuracy Limit:	$\pm$ 99.00 %
Imprecision Limit:	$\leq$ 99.00 %
Result:	PASSED

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### SECTION 9: STANDARD INFORMATION

Balance Used	Serial Number	Cal Date	Due Date	Mass Standard	Cal Due
P6	1120141622	03/22/17	04/01/18	P001	08/01/18

### SECTION 10: PARTS

NO MAINTENANCE SERVICE REQUESTED