

# Artel Pipette Calibration Report

<b>Pipette</b>	<b>R&amp;D-02380</b>
Model	Rainin Pipet-Lite LTS Pipette L-20XLS+
Serial Number	C1440980T
Nominal Volume	20.0000 µL
Owner	Axel Researcher (AxelR)
Location	R&D Laboratory

<b>Result</b>	<b>PASSED</b>
Completed	8/30/2016 12:06:13 PM
Calibration Plan	20-10-2 uL, 5 reps, mfgr specs, Version 1
Calibration ID	20160830115153R&D-02380

Volume	Mean	Uncertainty	Inaccuracy	Tolerance	Imprecision	Tolerance	Result
<b>20.00 µL</b>	19.998 µL	0.14 %	<b>-0.01 %</b>	<b>1.00 %</b>	<b>0.08 %</b>	<b>0.30 %</b>	<b>PASSED</b>
<b>10.000 µL</b>	9.9728 µL	0.35 %	<b>-0.27 %</b>	<b>1.50 %</b>	<b>0.39 %</b>	<b>0.50 %</b>	<b>PASSED</b>
<b>2.000 µL</b>	2.0258 µL	0.45 %	<b>1.29 %</b>	<b>7.50 %</b>	<b>0.50 %</b>	<b>2.00 %</b>	<b>PASSED</b>

Uncertainty values reported are the maximum of the comparison of calculated measurement uncertainty and declared laboratory CMC values.

Replicates (20.00 µL)	Channel:1	1	2	3	4	5 <sup>1</sup>	5
		19.98	20.01	20.02	19.99	18.26	19.99

**Comments:**

<sup>1</sup> Air bubble in tip.

Replicates (10.000 µL)	Channel:1	1	2	3 <sup>1</sup>	3	4	5 <sup>2</sup>	5
		9.950	9.951	10.772	10.041	9.959	9.767	9.963

**Comments:**

<sup>1</sup> Operator error; over-aspirated.

<sup>2</sup> Incomplete dispense.

Replicates (2.000 µL)	Channel:1	1	2	3	4 <sup>1</sup>	4	5
		2.042	2.024	2.014	7.553	2.025	2.024

**Comments:**

<sup>1</sup> Operator error; reverse-mode aspiration and forward-mode dispense.

**Materials**

PCS Range 3 Solution	lot number #R30705161, exp: 6/30/2017
PCS CAL A	lot number #C00627161, exp: 6/30/2017
PCS Blank Vial	lot number #B10211164, exp: 6/30/2017
PCS Range 4 Solution	lot number #R40706161, exp: 6/30/2017
Pipette Tips	LTS Tips Rainin, lot #389004736

**Environment**

Ambient temp: 22.8 °C
Rel. Humidity: 47.3 %
Bar.Pressure: 1008.0 hPa

**Operator Comment:**

This is an overall calibration comment. The pipette is in good shape, operator needs to be more focused.

Artel PCS	<b>Artel PCS 7010</b>	Measurements made with the Artel Pipette Calibration System (PCS®) are traceable to the International System of Units (SI) through reference standards developed and maintained by the National Institute of Standards and Technology, USA (NIST), and by the National Physics Laboratory, UK (NPL).  The PCS System and its components are covered by patents listed at: <a href="http://www.artel-usa.com/patents">http://www.artel-usa.com/patents</a>	
Firmware	PCS 7A3.000R		
Next Calibration	09/25/2016		
Last Calibration	20160825211219PCS3_7-7010		
<b>Operator</b>	<b>Thomas Smith (TomS)</b> <b>Calibration Technician</b>	<b>Signature</b>	<b>(Signed Electronically)</b>
		<b>Date</b>	<b>8/30/2016 12:06:13 PM</b>
<b>Reviewer</b>	<b>Janet Manager (JanetM)</b> <b>Laboratory Manager</b>	<b>Signature</b>	<b>(Signed Electronically)</b>
		<b>Date</b>	<b>8/30/2016 12:25:23 PM</b>
<b>Approval Status</b>	<b>Approved</b>		

**Reviewer Comment:**

Calibration approved as pipette seems to work fine. Training plan for operator will be devised due to high frequency of operator-caused mistakes.



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04092-2013