



# Bios

Driving a Higher Standard  
in Flow Measurement<sup>SM</sup>

## Calibration Certificate

Certificate No. 502443  
 Product Defender 520 Medium Flow  
 Serial No. 115944  
 Cal. Date 12/12/2008  
 Sales Date 2/19/2009 *Calibration interval commences on sale date.*

All calibrations are performed in accordance with ISO 17025 at Bios International Corporation, 10 Park Place, Butler, NJ, 07405, 800-663-4977, an ISO 17025:2005 – accredited laboratory through NVLAP. This report shall not be reproduced except in full without the written approval of the laboratory. Results only relate to the items calibrated. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

All units tested in accordance with Bios International Corporation test number PR17-13 using high-purity bottled nitrogen or dry filtered laboratory air.

### Calibration Data

Technician Zenaida Ortiz  
 Lab. Pressure 737 mmHg  
 Lab. Temperature 22.5 °C

Instrument Reading	Lab Standard Reading	Deviation	Allowable Deviation	As Shipped
100.47 ccm	100.525 ccm	-0.05 %	1.00%	In Tolerance
1,006.6 ccm	1008.15 ccm	-0.15 %	1.00%	In Tolerance
5,002.8 ccm	5006.4 ccm	-0.07 %	1.00%	In Tolerance
22.5 °C	22.2 °C	-	±0.8°C	In Tolerance
737 mmHg	737 mmHg	-	±3.5 mHg	In Tolerance

### Bios International Standards Used

Description	Standard Serial Number	Calibration Date	Calibration Due Date
ML 500-24	113775	5/1/2008	5/1/2009
Precision Thermometer	305460	5/1/2008	5/1/2009
Precision Barometer	431/98-07	4/8/2008	4/8/2009

### Calibration Notes

Bios is an ISO 17025-accredited metrology laboratory. Each Bios primary gas flow standard is dynamically verified by comparing it to one of our laboratory standards, which is a Proven DryCal® Technology volumetric piston prover of much higher accuracy but of similar operating principles. For this purpose, a flow generator of ±0.03% stability is used. Our laboratory standards are qualified by direct measurement of their dimensions (diameter, length and time) using NIST-traceable precision gauges and instruments, such as depth micrometers and laser micrometers. NIST numbers for these gauges and instruments are available upon request. Rigorous analyses of our laboratory standards' uncertainties have been performed, in accordance with The Guide to the Expression of Uncertainty in Measurement (the GUM), assuring their traceable accuracy.

Harvey Padden, President and Chief Metrologist