

CALIBRATION CERTIFICATE NO. C09-123

Calibration Date: January 19th 2010

Certificate issued: January 19th 2010

--Company name--

--Company Address--

Calibration of
Massflow meter Brooks S/N: T031-008-45

QUALITY PROGRAM CONFORMANCE

All calibrations are performed in accordance with Polycontrols Laboratory Quality Assurance Manual, Rev. 01.2009 and conform to ISO/IEC 17025 – 2005, ISO 9001 – 2000 and/or other quality requirements defined in customers purchase descriptions.

TRACEABILITY

The traceability for flow standard to the National Institute of Standards and Technology, NIST, is maintained by DH Instruments of Phoenix, Arizona and conform to ISO/IEC 17025, ANSI/NCSL Z540-1-1994, ISO-10012-1 and MIL-STD 45662A.

The Calibration Laboratory Assessment Service (CLAS) of the National Research Council of Canada (NRC) has assessed and certified specific calibration capabilities of this laboratory and traceability to the International System of Units (SI) or to standards acceptable to the CLAS program. This certificate of calibration is issued in accordance with the conditions of certification granted by CLAS and the conditions of accreditation granted by the Standards Council of Canada (SCC). Neither CLAS nor SCC guarantee the accuracy of individual calibrations by accredited laboratories.

THE BEST UNCERTAINTY

References used for flow calibration have an uncertainty of $\pm 0.2\%$ of reading for a flow range between 5 SCCM to 10 SLPM, $\pm 0.3\%$ of reading for a flow range between 10 SLPM to 30 SLPM, $\pm 0.2\%$ of reading for a flow range between 30 SLPM to 3000 SLPM, $\pm 0.3\%$ of reading for a flow range above 3000 SLPM to 6000 SLPM and $\pm 0.5\%$ of reading for a flow range under 5 SCCM to 1 SCCM. Test and reference uncertainties are given with a coverage factor of 2 for a 95% level of confidence. The test uncertainty ratio (TUR) of this calibration is at least 4:1 unless otherwise stated.

CONDITION SUMMARY OF THE DEVICE UNDER TEST

Initials conditions: IN GOOD CONDITION
Work done: CLEANING & CALIBRATION
Result: - FINAL READINGS ARE IN TOLERANCE
Remarks: THE UNIT HAS BEEN AJUSTED

Metrologist

Laboratory Manager

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<i>Technical information</i>			
Customer ID:	--Company name--	Lab identification:	Station 1
Serial Number:	T031-008-45	Certificate Number:	C09123
Calibration date:	2010-01-17	Procedure:	POS-CAL-001

<i>Standard equipment used for initial calibration</i>				
<i>Description</i>	<i>Model</i>	<i>Serial #</i>	<i>Traceability</i>	<i>Due Date</i>
DHI molbloc (500 sccm)	5E2-VCR-V-Q	2520	NIST 65003	2010/01/26
DHI molbox	Molbox-1	755	NIST 68171	2010/09/29
Fluke 726	726	9007012	NIST 151132	2010/10/31

<i>Initial specifications of the device under test</i>		<i>Calibration conditions</i>	
Gas	N2	Gas	N2
Operation temperature	20 °C	Ambient temperature	20 °C
Inlet pressure	20 Psig	Ambient pressure	1013 mBar
Outlet pressure	5 Psig	Gas temperature	21.1 °C
Reference temperature	21 °C	Inlet pressure	20 Psig
Reference pressure	N/A	Outlet pressure	5 Psig
Range	0 - 500 SCCM	Correction factor	1
Input / Output Signal	0 - 5 Volts	Orientation	Horizontal
Supply	±15 Vdc	Seals	Viton
Accuracy	± 1 % FS	Valve	Viton

<i>Initial readings</i>					
<i>Device under test</i>		<i>Flow Reference</i>	<i>Calculated Error</i>	<i>Acceptable Error</i>	<i>TUR</i>
Volts	SCCM N2	SCCM	% full scale	% full scale	
-0.075	-7.500	0.000	1.500	1.000	
0.250	25.000	21.923	-0.615	1.000	
0.500	50.000	48.873	-0.225	1.000	
1.250	125.000	124.105	-0.179	1.000	
2.500	250.000	252.545	0.509	1.000	
3.750	375.000	378.123	0.625	1.000	
5.000	500.000	510.876	2.175	1.000	

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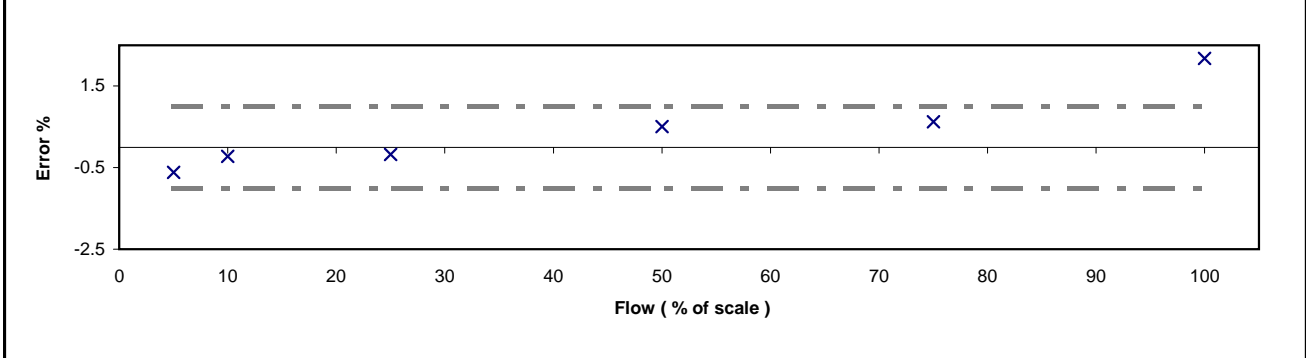
Signature



Technical information

Customer ID:	--Company name--	Lab identification:	Station 1
Serial Number:	T031-008-45	Certificate Number:	C09123
Calibration date:	17/01/2010	Procedure:	POS-CAL-001

Initial calibration graph result



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Signature



<i>Technical information</i>			
Customer ID:	--Company name--	Lab identification:	Station 1
Serial Number:	T031-008-45	Certificate Number:	C09123
Calibration date:	2010/01/19	Procedure:	POS-CAL-001

<i>Standard equipment used for final calibration</i>				
<i>Description</i>	<i>Model</i>	<i>Serial #</i>	<i>Traceability</i>	<i>Due Date</i>
DHI molbloc (500 sccm)	5E2-VCR-V-Q	2520	NIST 65003	2010/01/26
DHI molbox	Molbox-1	755	NIST 68171	2010/09/29
Fluke 726	726	9007012	NIST 151132	2010/10/31

<i>Final specifications of the device under test</i>		<i>Calibration conditions</i>	
Gas	N2	Gas	N2
Operation temperature	20 °C	Ambient temperature	20 °C
Inlet pressure	20 Psig	Ambient pressure	1020 mbar
Outlet pressure	5 Psig	Gas temperature	20.5 °C
Reference temperature	21 °C	Inlet pressure	20 Psig
Reference pressure	N/A	Outlet pressure	5 Psig
Range	0 - 500 SCCM	Correction factor	1
Input / Output Signal	0 - 5 Volts	Orientation	Horizontal
Supply	±15 Vdc	Seals	Viton
Accuracy	± 1 % FS	Valve	Viton

<i>Final Calibration results</i>					
<i>Device under test</i>		<i>Flow Reference</i>	<i>Calculated Error</i>	<i>Acceptable Error</i>	<i>TUR</i>
Volts	SCCM N2	SCCM	% full scale	% full scale	
0.250	25.000	25.047	0.009	1.000	
0.500	50.000	50.096	0.019	1.000	
1.250	125.000	125.005	0.001	1.000	
2.500	250.000	249.976	-0.005	1.000	
3.750	375.000	374.958	-0.008	1.000	
5.000	500.000	499.948	-0.010	1.000	

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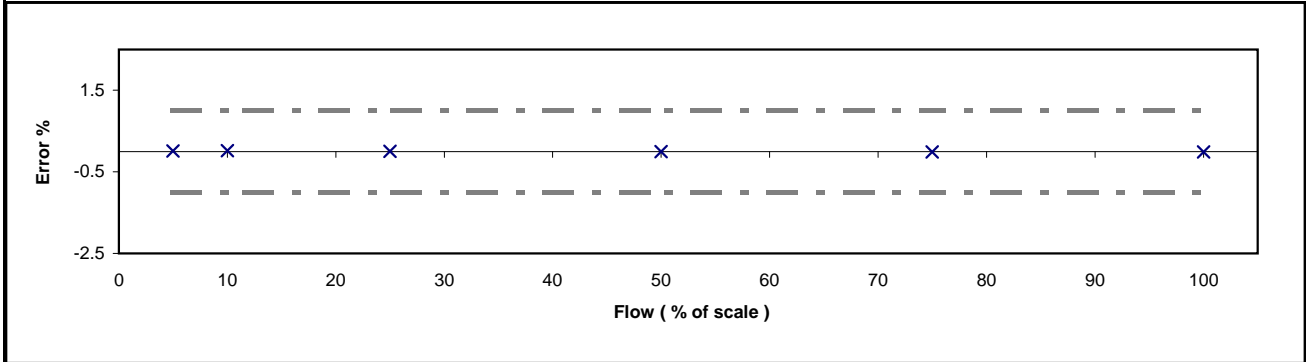
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Final calibration graph result



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Signature