

Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone -- Fax 920-596-2983  
uts@wolfnet.net

## Metco Multi / Uni-Coat Certificate of Calibration

Form Number: F-315-026 Rev. L 16-Oct-18  
Work Instruction: WI-026 Rev. A 22-Feb-10

Page: 1 of 16

Certificate Number: 2023-035

Customer: Universal Thermal	Console: Metco MultiCoat	9MP-CL #3 Feeder: 9MP-CL	9MP-DJ-CL #1 Feeder: 9MPE-DJ-CL
Address: 217 Center St	Serial Number: SM090545	Serial Number: A9MPCL20050901-1	Serial Number: A9MPEDJCL2030908-1
City: Manawa	Device ID Number: PTS 167	Device ID: PTS 166	Device ID: PTS 168
State/Province: WI	Booth Number: 1		
Zip: 54949	Calibration As Received		
Name: Allen Hildebrand	With in 3%: No	9MP-CL #2 Feeder: 9MP-CL	
Phone Number: 920-596-2983	Adjustments: Yes	Serial Number: A9MPCL20071019-1	
		Device ID: PTS 169	

### N.I.S.T. Instruments Used for This Calibration

Test Instrument: Press. Transducer	Test Instrument: Multi Meter	Test Instrument: Amp Clamp	Test Instrument: Multi Meter
Make: Fluke	Make: Fluke	Make: Fluke	Make: Fluke
Model: PV350	Model: 87-V	Model: i1010	Model: 233
Serial Number: PM-22	Serial Number: MM-7	Serial Number: AC-46	Serial Number: MM-5
Next Calibration Due: 6-Oct-24	Next Calibration Due: 1-Jul-24	Next Calibration Due: 31-Oct-24	Next Calibration Due: 17-Mar-24

				Serial Numbers:	
Test Instrument: Low Flow	Test Instrument: Med.	Test Instrument: High	Weight Set:	Set 1	3NGF
Make: Mass Flow Meter	Make: Mass Flow Meter	Make: Mass Flow Meter	Sizes:	1Kg, 3Kg, 4Kg, 5Kg, 5Kg	3NGF
Model: Alicat 75 scfh	Model: Alicat 400 scfh	Model: Alicat 2150 scfh	Next Calibration Due:	31-Aug-24	3NGF
Serial Number: PCU	Serial Number: PCU	Serial Number: PCU			3NGF
Serial Number: 299411	Serial Number: 299412	Serial Number: 299413			3NGF
Next Calibration Due: 12-Sep-24	Next Calibration Due: 12-Sep-24	Next Calibration Due: 12-Sep-24			3NGF

### Mass Flow Controllers Installed in this Metco Gas Module and Feeders

	Plasma	Plasma	Plasma	Plasma	#1 Feeder Plasma	#2 Feeder Plasma	#1 Feeder Plasma	#2 Feeder Plasma
Mass Flow Controller:	Argon Primary	Nitrogen Primary	Hydrogen		Carrier Ar/N2 MFC	Carrier Ar/N2 MFC	Pressure Regulator	Pressure Regulator
Make:	Bronkhorst	Bronkhorst	Bronkhorst		Parker	Parker		
Device ID:	N/A	N/A	N/A		N/A	N/A		
Serial Number:	M8211606D	M8209268AA	M9204381		3467240102001	3722420001007	N/A	N/A
Flow Range:	100 In/min	100 In/min	20 In/min		25/21.2 In/min	25/21.2 In/min		
	DJ HVOF	DJ HVOF	DJ HVOF				#3 Feeder HVOF	#3 Feeder HVOF
Mass Flow Controller:	Air	Oxygen	H2 Fuel				Carrier N2	Pressure Regulator
Make:	Bronkhorst	Bronkhorst	Bronkhorst				Bronkhorst	
Device ID:	N/A	N/A	N/A				N/A	
Serial Number:	M9206234D	M9204982H	M9206129A				M8209620B	N/A
Flow Range:	800 SCFH	400 SCFH	800 SCFH				20 In/min	

### Plasma System Performance w/Parameters as Provided by the Operator Initially

Gas	Plasma Settings	Gun		
	Scfh Gas Flow			
Ar	127			
H2	17	Amps		
N2	0	500		
He	N/A	Volts		
		58.12		

In The % of Deviation Column of Each Sheet After This Sheet Is The Manufacture Specifications, or Better, For The Individual Device  
**0 - 2% Green** is Acceptable  
**2.1 - 3% Orange** is Alert  
**3.1% -> Red** Is Fail

**Notes:**

Adjusted Shroud Air, #2 Feeder Argon and Nitrogen Flows, #3 Feeder Argon Flows

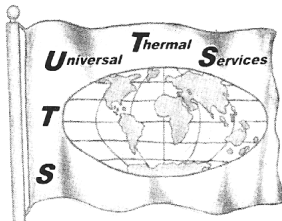
#1 Feeder Vibrator is out of adjustment. We were not able to adjust due to we could not run it in Local mode to allow for adjustments. It only job is to make the powder fall at a smooth rate. Reference Only is sufficient for now until we find a solution to disconnect the feeder from the system.

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature: *Allen R. Hildebrand*

**All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!**



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Theri

## Amperage and Voltage Meter

Certificate Number: 2023-035

Form Number: F-315-026 Rev. L 16-Oct-18

Page: 2 of 16

Console: Metco MultiCoat Serial Number: SM090545 Booth: 1

Testing Instrument: Amp Clamp i1010 Serial Number: AC-46 Testing Instrument: Multi Meter 233 Serial Number: MM-5

### Amp Meter

Device Under Test: Digital Amp Meter Amps Full Scale [FS] 2000

Device ID Number:

Amps Set Point	Amp Meter Display Reading	As Found NIST Meter	As Found Amps Deviation	As Found Amps % Deviation	Tolerences Pass/Fail	As Left NIST Meter	As Left Amps Deviation	As Left Amps % Deviation	Tolerences Pass/Fail
300	300	302.0	2.0	0.1	Pass	302.0	2.0	0.1	Pass
400	400	404.0	4.0	0.2	Pass	404.0	4.0	0.2	Pass
500	500	505.0	5.0	0.3	Pass	505.0	5.0	0.3	Pass
600	600	606.0	6.0	0.3	Pass	606.0	6.0	0.3	Pass
700	700	706.0	6.0	0.3	Pass	706.0	6.0	0.3	Pass
800	800	807.0	7.0	0.4	Pass	807.0	7.0	0.4	Pass
900	900	908.0	8.0	0.4	Pass	908.0	8.0	0.4	Pass
1000	1000	1009.0	9.0	0.5	Pass	1009.0	9.0	0.5	Pass

### Volt Meter

Device Under Test: Digital Volt Meter Volts Full Scale [FS] 200

Device ID Number:

Testing Instrument: Multi Meter 233 Serial Number: MM-5

Volt Meter Set Point	Volt Meter Display Reading	As Found NIST Meter	As Found Volts Deviation	As Found Volts % Deviation	Tolerences Pass/Fail	As Left NIST Meter	As Left Volts Deviation	As Left Volts % Deviation	Tolerences Pass/Fail
30.5	30.5	31.0	0.5	0.3	Pass	31.0	0.5	0.3	Pass
37.6	37.6	38.0	0.4	0.2	Pass	38.0	0.4	0.2	Pass
42.3	42.3	43.5	1.2	0.6	Pass	43.5	1.2	0.6	Pass
50.7	50.7	50.7	0.0	0.0	Pass	50.7	0.0	0.0	Pass
57.8	57.8	58.4	0.6	0.3	Pass	58.4	0.6	0.3	Pass
61.4	61.4	61.9	0.5	0.3	Pass	61.9	0.5	0.3	Pass

### System Performance w/Parameters after Calibration

Gas	Gas Flow	Volts						
Ar	127							
H2	17	Amps						
N2	0	500						
He	N/A							

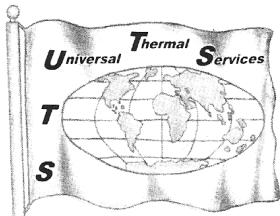
Calibrated By: Allen Hildebrand

Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature:

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolffnet.net

Customer: Universal Therma

## Primary Argon Flow-Plasma

Form Number: F-315-026 Rev. L 16-Oct-18

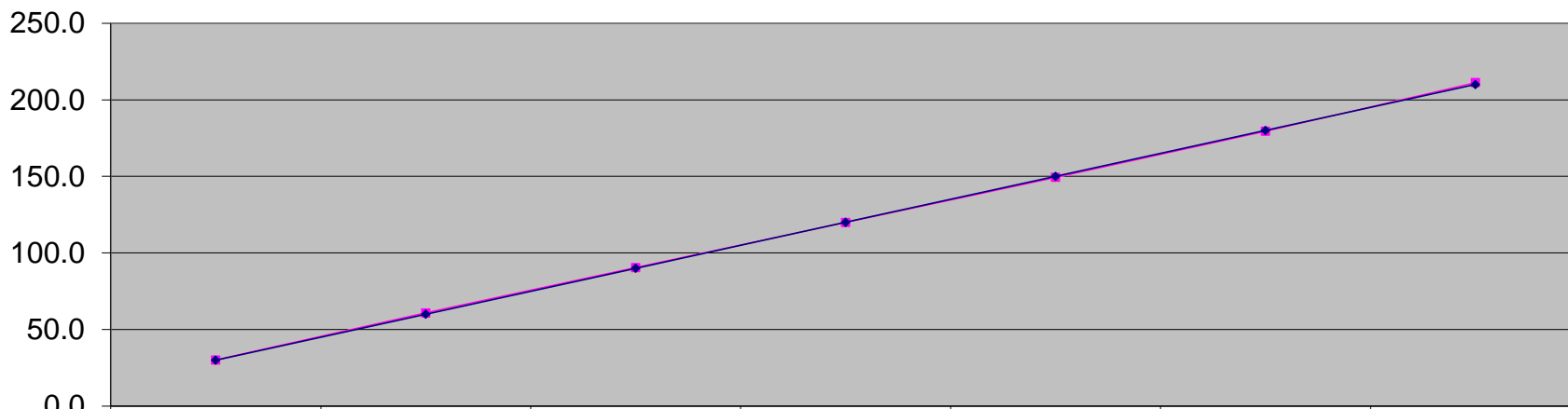
Certificate Number: 2023-035

Page: 3 of 16

Console:	Metco MultiCoat	Serial Number:	M8211606D	Type of Gas:	Argon
Device ID Number:	N/A	Booth:	1		
Device Under Test:	Ar Mass Flow Contr.	Serial Number:	M8211606D	Flow Range:	100 In/min
				Scale Rate:	Flow is in SCFH
					Full Flow SCFH [FS]: 228

Testing Instrument:	Alicat 400 scfh	PCU	Serial Number:	299412
---------------------	-----------------	-----	----------------	--------

Metco MultiCoat Display Actual	Metco MultiCoat SCFH Set Point	As Found NIST SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerances Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerances Pass/Fail
30.1	30	30.1	0.1	0.0	Pass	30.1	0.1	0.0	Pass
60.1	60	60.8	0.8	0.4	Pass	60.8	0.8	0.4	Pass
90.0	90	90.5	0.5	0.2	Pass	90.5	0.5	0.2	Pass
120.1	120	119.8	-0.2	-0.1	Pass	119.8	-0.2	-0.1	Pass
150.1	150	149.4	-0.6	-0.3	Pass	149.4	-0.6	-0.3	Pass
180.1	180	179.5	-0.5	-0.2	Pass	179.5	-0.5	-0.2	Pass
210.0	210	211.2	1.2	0.5	Pass	211.2	1.2	0.5	Pass



	1	2	3	4	5	6	7
Flow SCFH As Found	30.1	60.8	90.5	119.8	149.4	179.5	211.2
Flow SCFH As Left	30.1	60.8	90.5	119.8	149.4	179.5	211.2
SCFH Set Point	30	60	90	120	150	180	210

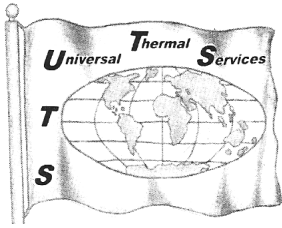
Calibrated By: Allen Hildebrand

Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature:

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone -- Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therm

## Primary Nitrogen Flow-Plasma

Form Number: F-315-026 Rev. L 16-Oct-18

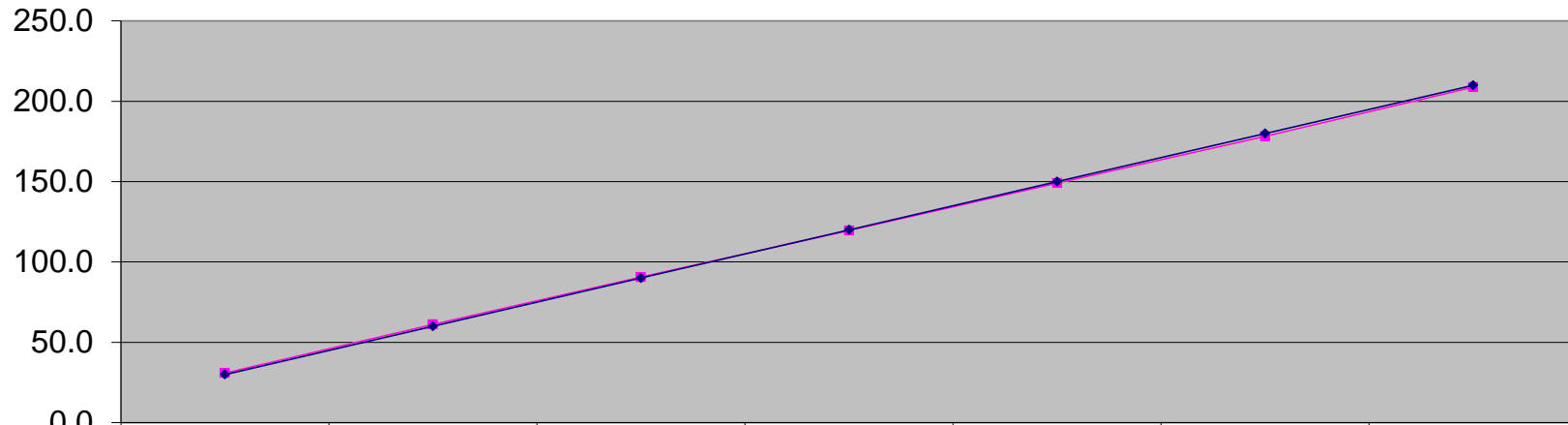
Certificate Number: 2023-035

Page: 4 of 16

Console:	Metco MultiCoat	Serial Number:	SM090545	Type of Gas:	Nitrogen
Device ID Number:	N/A	Booth:	1		
Device Under Test:	N2 Mass Flow Control.	Serial Number:	M8209268AA	Flow Range:	100 In/min
				Scale Rate:	Flow is in SCFH
					Full Flow SCFH [FS]: 228.3

Testing Instrument:	Alicat 400 scfh	PCU	Serial Number:	299412
---------------------	-----------------	-----	----------------	--------

Metco MultiCoat Display Actual	Metco MultiCoat SCFH Set Point	As Found NIST SCFH	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerances Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerances Pass/Fail
30.0	30	30.9	30.9	0.9	0.4	Pass	30.9	0.9	0.4	Pass
60.1	60	61.1	61.1	1.1	0.5	Pass	61.1	1.1	0.5	Pass
90.0	90	90.7	90.7	0.7	0.3	Pass	90.7	0.7	0.3	Pass
120.1	120	119.5	119.5	-0.5	-0.2	Pass	119.5	-0.5	-0.2	Pass
150.1	150	149.1	149.1	-0.9	-0.4	Pass	149.1	-0.9	-0.4	Pass
180.1	180	178.2	178.2	-1.8	-0.8	Pass	178.2	-1.8	-0.8	Pass
210.0	210	208.8	208.8	-1.2	-0.5	Pass	208.8	-1.2	-0.5	Pass

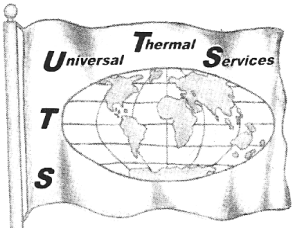


	1	2	3	4	5	6	7
Flow SCFH As Found	30.9	61.1	90.7	119.5	149.1	178.2	208.8
Flow SCFH As Left	30.9	61.1	90.7	119.5	149.1	178.2	208.8
SCFH Set Point	30	60	90	120	150	180	210

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24  
Signature: *Allen R. Hildebrand*

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone -- Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therm

## Secondary H2 Flow-Plasma

Form Number: F-315-026 Rev. L 16-Oct-18

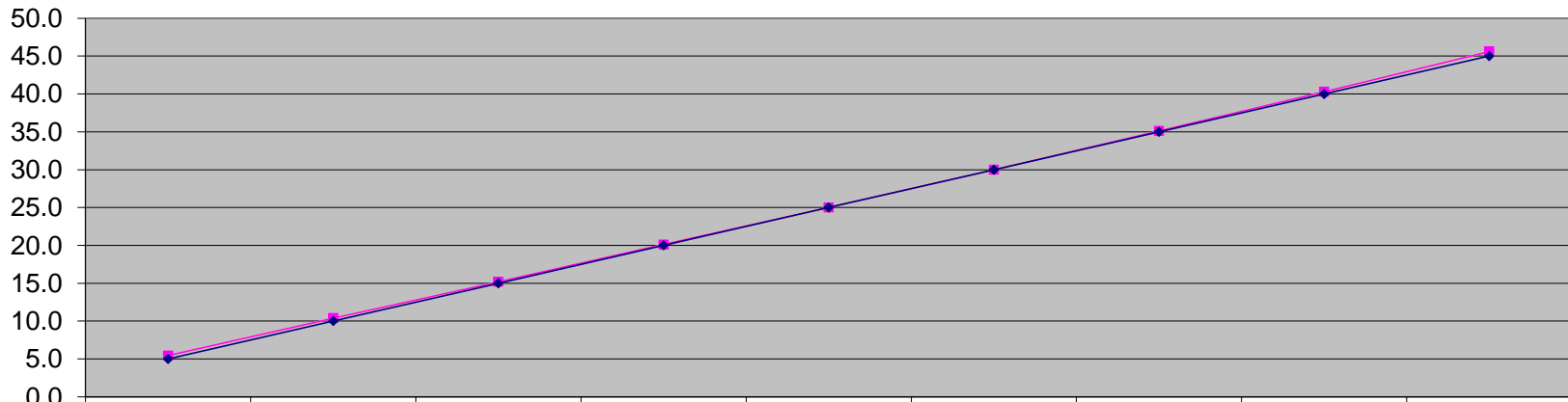
Certificate Number: 2023-035

Page: 5 of 16

Console:	Metco MultiCoat	Serial Number:	SM090545	Type of Gas:	Hydrogen
Device ID Number:	N/A	Booth:	1		
Device Under Test:	H2 Mass Flow Contr.	Serial Number:	M9204381	Flow Range:	20 In/min
		Scale Rate:	Flow is in SCFH	Full Flow SCFH [FS]:	45.7

Testing Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411
---------------------	----------------	-----	----------------	--------

Metco MultiCoat Display Actual	Metco MultiCoat SCFH Set Point	As Found NIST SCFH	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerances Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerances Pass/Fail
5.0	5	5.5	5.5	0.5	1.0	Pass	5.5	0.5	1.0	Pass
10.0	10	10.4	10.4	0.4	0.9	Pass	10.4	0.4	0.9	Pass
15.0	15	15.2	15.2	0.2	0.4	Pass	15.2	0.2	0.4	Pass
20.0	20	20.1	20.1	0.1	0.2	Pass	20.1	0.1	0.2	Pass
25.0	25	25.0	25.0	0.0	0.0	Pass	25.0	0.0	0.0	Pass
30.0	30	30.0	30.0	0.0	0.0	Pass	30.0	0.0	0.0	Pass
35.0	35	35.1	35.1	0.1	0.2	Pass	35.1	0.1	0.2	Pass
40.0	40	40.3	40.3	0.3	0.7	Pass	40.3	0.3	0.7	Pass
45.0	45	45.6	45.6	0.6	1.3	Pass	45.6	0.6	1.3	Pass



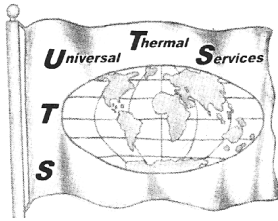
	1	2	3	4	5	6	7	8	9
Flow SCFH As Found	5.5	10.4	15.2	20.1	25.0	30.0	35.1	40.3	45.6
Flow SCFH As Left	5.5	10.4	15.2	20.1	25.0	30.0	35.1	40.3	45.6
SCFH Set Point	5	10	15	20	25	30	35	40	45

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature:

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therm

## Air/N2 Flow-DJ HVOF

Form Number: F-315-026 Rev. L 16-Oct-18

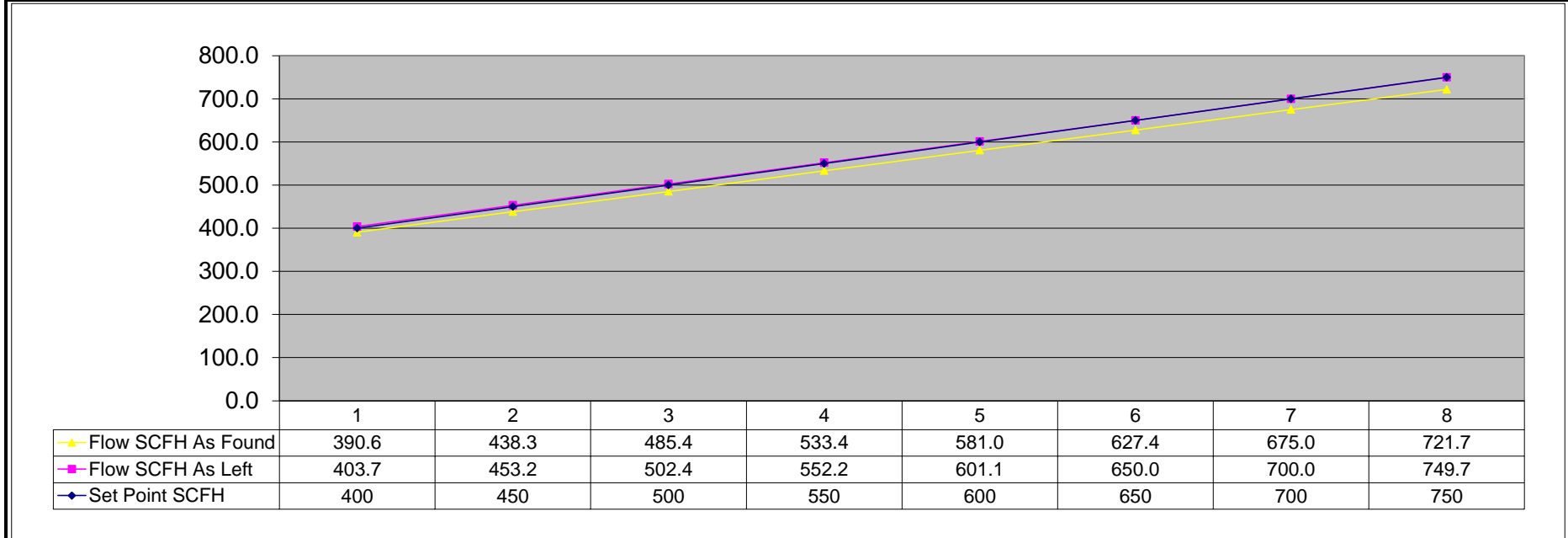
Certificate Number: 2023-035

Page: 6 of 16

Console:	Metco MultiCoat	Serial Number:	SM090545	Type of Gas:	Air
Device ID Number:	N/A	Booth:	1		
Device Under Test:	Air Mass Flow Contr.	Serial Number:	M9206234D	Flow Range:	800 SCFH
				Scale Rate:	Flow is in SCFH
					Full Flow SCFH [FS]:

Testing Instrument:	Alicat 2150 scfh	PCU	Serial Number:	299413
---------------------	------------------	-----	----------------	--------

		Adjusted								
Metco MultiCoat Display Actual	Metco MultiCoat SCFH Set Point	As Found NIST SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerances Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerances Pass/Fail	
400.0	400	390.6	-9.4	-1.2	Pass	403.7	3.7	0.5	Pass	
450.0	450	438.3	-11.7	-1.5	Pass	453.2	3.2	0.4	Pass	
500.0	500	485.4	-14.6	-1.8	Pass	502.4	2.4	0.3	Pass	
551.0	550	533.4	-16.6	-2.1	Alert	552.2	2.2	0.3	Pass	
600.0	600	581.0	-19.0	-2.4	Alert	601.1	1.1	0.1	Pass	
650.0	650	627.4	-22.6	-2.8	Alert	650.0	0.0	0.0	Pass	
700.0	700	675.0	-25.0	-3.1	Fail	700.0	0.0	0.0	Pass	
750.0	750	721.7	-28.3	-3.5	Fail	749.7	-0.3	0.0	Pass	



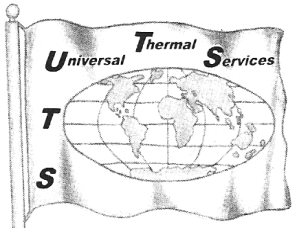
Calibrated By: Allen Hildebrand

Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature:

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therm

## Oxygen Flow-DJ HVOF

Form Number: F-315-026 Rev. L 16-Oct-18

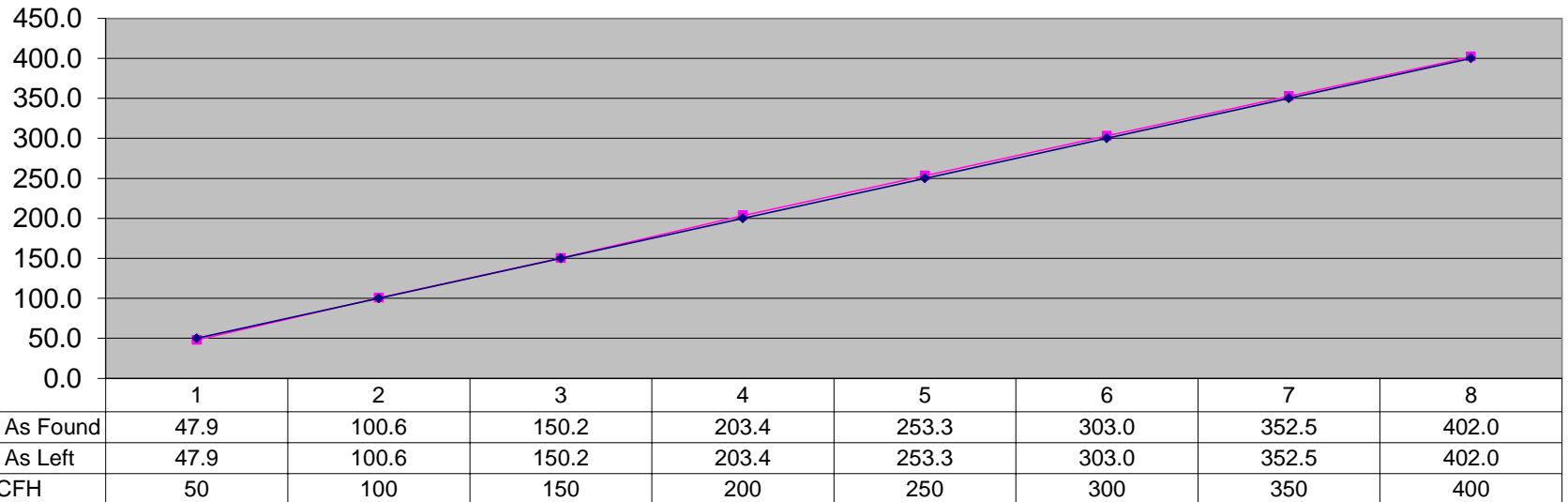
Certificate Number: 2023-035

Page: 7 of 16

Console:	Metco MultiCoat	Serial Number:	SM090545	Type of Gas:	Oxygen
Device ID Number:	N/A	Booth:	1		
Device Under Test:	O2 Mass Flow Cont.	Serial Number:	M9204982H	Flow Range:	400 SCFH
				Scale Rate:	Flow is in SCFH
				Full Flow SCFH [FS]:	

Testing Instrument:	Alicat 2150 scfh	PCU	Serial Number:	299413
---------------------	------------------	-----	----------------	--------

Metco MultiCoat Display Actual	Metco MultiCoat SCFH Set Point	As Found NIST SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerances Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerances Pass/Fail
50.0	50	47.9	-2.1	-0.5	Pass	47.9	-2.1	-0.5	Pass
100.0	100	100.6	0.6	0.1	Pass	100.6	0.6	0.1	Pass
150.0	150	150.2	0.2	0.0	Pass	150.2	0.2	0.0	Pass
200.0	200	203.4	3.4	0.9	Pass	203.4	3.4	0.9	Pass
250.0	250	253.3	3.3	0.8	Pass	253.3	3.3	0.8	Pass
300.0	300	303.0	3.0	0.8	Pass	303.0	3.0	0.8	Pass
350.0	350	352.5	2.5	0.6	Pass	352.5	2.5	0.6	Pass
400.0	400	402.0	2.0	0.5	Pass	402.0	2.0	0.5	Pass

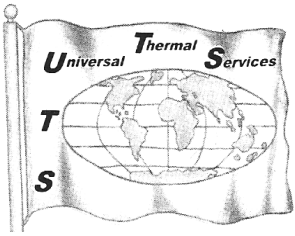


Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature: *Allen R Hildebrand*

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therm

## Hydrogen Flow-DJ HVOF

Form Number: F-315-026 Rev. L 16-Oct-18

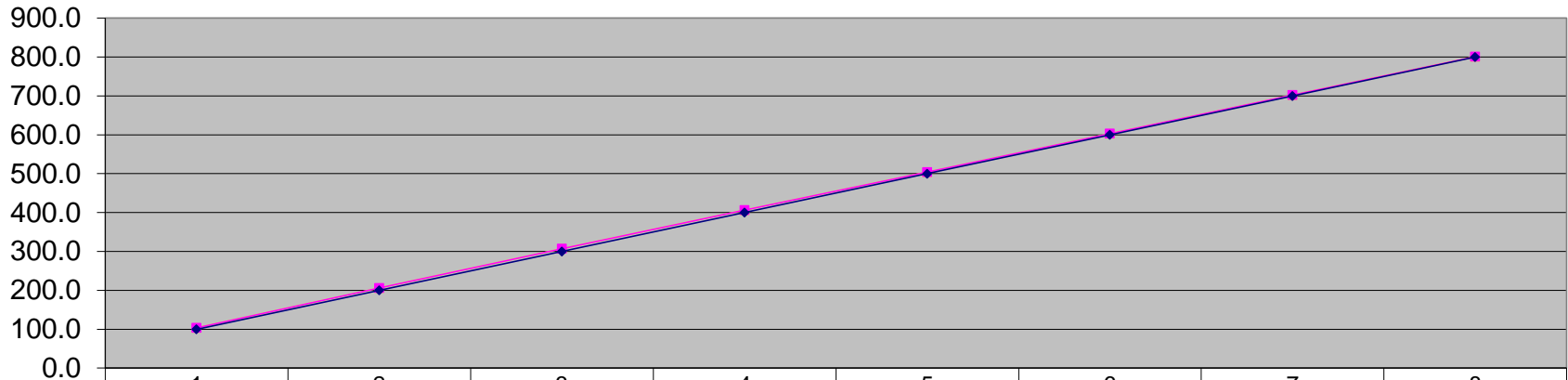
Certificate Number: 2023-035

Page: 8 of 16

Console:	DJC	Serial Number:	SM090545	Type of Gas:	Hydrogen
Device ID Number:	N/A	Booth:	1		
Device Under Test:	H2 Mass Flow Contr.	Serial Number:	M9206129A	Flow Range:	800 SCFH
				Scale Rate:	Flow is in SCFH
				Full Flow SCFH [FS]:	

Testing Instrument: Alicat 2150 scfh PCU Serial Number: 299413

Metco MultiCoat Display Actual	Metco MultiCoat SCFH Set Point	As Found NIST SCFH	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerances Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerances Pass/Fail
100.0	100	103.9	103.9	3.9	0.5	Pass	103.9	3.9	0.5	Pass
200.0	200	205.8	205.8	5.8	0.7	Pass	205.8	5.8	0.7	Pass
301.0	300	307.1	307.1	7.1	0.9	Pass	307.1	7.1	0.9	Pass
401.0	400	406.3	406.3	6.3	0.8	Pass	406.3	6.3	0.8	Pass
500.0	500	504.3	504.3	4.3	0.5	Pass	504.3	4.3	0.5	Pass
600.0	600	603.1	603.1	3.1	0.4	Pass	603.1	3.1	0.4	Pass
702.0	700	702.4	702.4	2.4	0.3	Pass	702.4	2.4	0.3	Pass
801.0	800	801.0	801.0	1.0	0.1	Pass	801.0	1.0	0.1	Pass



Calibrated By: Allen Hildebrand

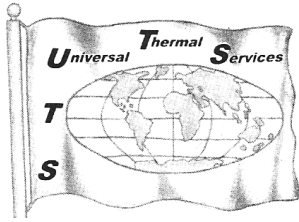
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature:

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!





Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Thermal

## Vibrator Air Pressure-Plasma #3 9MP-CL

Form Number: F-315-026 Rev. L 16-Oct-18

Certificate Number: 2023-035

Page 9 of 16

Powder Feeder #3	9MP-CL	Serial Number:	A9MPCL20050901-1
Device ID Number:	PTS 166	Booth Number:	1
Device Under Test:	Vibrator EP2	Device S/N:	N/A

Testing Instrument:	Multi Meter	87-V	Serial Number:	MM-7	Testing Instrument:	Press. Transducer	PV350	Serial Number:	PM-22
---------------------	-------------	------	----------------	------	---------------------	-------------------	-------	----------------	-------

Pressure Full Scale = 60 PSI

Pressure (PSI) Set Point	As Set Gauge Setting	As Found NIST Pressure	As Found PSI Deviation	As Found PSI % of Deviation	Tolerances Pass/Fail	As Left NIST Pressure	As Left PSI Deviation	As Left PSI % Deviation	Tolerances Pass/Fail
10	10	10.1	0.1	0.2	Pass	10.1	0.1	0.2	Pass
20	20	20.3	0.3	0.5	Pass	20.3	0.3	0.5	Pass
30	30	30.4	0.4	0.7	Pass	30.4	0.4	0.7	Pass
40	40	40.4	0.4	0.7	Pass	40.4	0.4	0.7	Pass
50	50	50.9	0.9	1.5	Pass	50.9	0.9	1.5	Pass

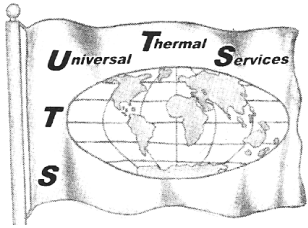
Weight Set:	Set 1	Serial Numbers:
Sizes:	1Kg, 3Kg, 4Kg, 5Kg, 5Kg	3NGF
Next Calibration Due:	31-Aug-24	3NGF
		3NGF
		3NGF
		3NGF

Hopper Weight Test in Kg Weight Kilo Gram	NIST Hopper Kg Weight As Found	Hopper Kg Weight Deviation As Found	Hopper Kg Weight % of Deviation	NIST Hopper Kg Weight As Left	Hopper Kg Weight Deviation As Found	Hopper Kg Weight % of Deviation
1.00	1.00	0.00	0.0	1.00	0.00	0.0
2.00	2.00	0.00	0.0	2.00	0.00	0.0
4.00	4.00	0.00	0.0	4.00	0.00	0.0
5.00	5.00	0.00	0.0	5.00	0.00	0.0
10.00	9.99	-0.01	-0.1	9.99	-0.01	-0.1
15.00	14.99	-0.01	-0.1	14.99	-0.01	-0.1

Hopper Pressure Command	Hopper Pressure Displayed As Found	Hopper Pressure NIST Manometer	Hopper Pressure NIST As Left [2nd]
Low: 42	42	40.5	40.5
High: 334	334	338	337.5

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23  
Calibration Due: 5-Dec-24  
Signature: *Allen R. Hildebrand*

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therma

## Argon Carrier Gas Flow-Plasma #3 9MP-CL

Form Number: F-315-026 Rev. L 16-Oct-18

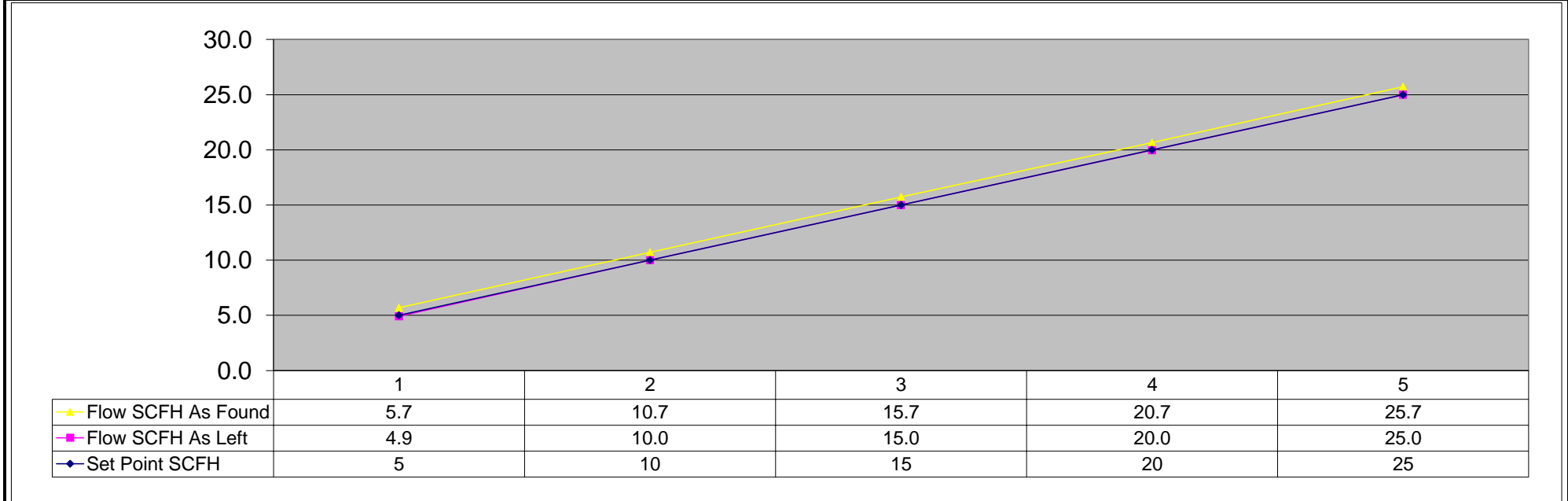
Certificate Number: 2023-035

Page: 10 of 16

Powder Feeder #3:	9MP-CL	Serial Number:	A9MPCL20050901-1
Device ID Number:	PTS 166	Booth Number:	1
Device Under Test:	Porter Mass Flow Cntr.	Device S/N:	3467240102001
Scale Rate:		Flow is in SCFH	
Flow Range:		0-29.7 SCFH	
Type of Gas:		Argon	

Testing Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411
---------------------	----------------	-----	----------------	--------

SCFH Set Point	SCFH Indicated On Display	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerance Pass / Fail	Adjusted		As Left SCFH % Deviation	Tolerance Pass / Fail
						As Left Actual SCFH	As Left SCFH Deviation		
5	5	5.7	0.7	2.3	Alert	4.9	-0.1	-0.3	Pass
10	10	10.7	0.7	2.4	Alert	10.0	0.0	0.0	Pass
15	15	15.7	0.7	2.5	Alert	15.0	0.0	0.0	Pass
20	20	20.7	0.6	2.2	Alert	20.0	0.0	-0.1	Pass
25	25	25.7	0.7	2.4	Alert	25.0	0.0	0.0	Pass

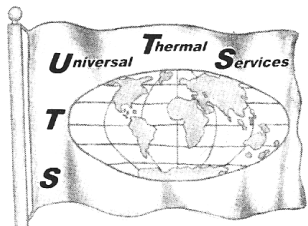


Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature: *Allen R. Hildebrand*

**All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!**



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone -- Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therma

## Nitrogen Carrier Gas Flow-Plasma #3 9MP-CL

Form Number: F-315-026 Rev. L 16-Oct-18

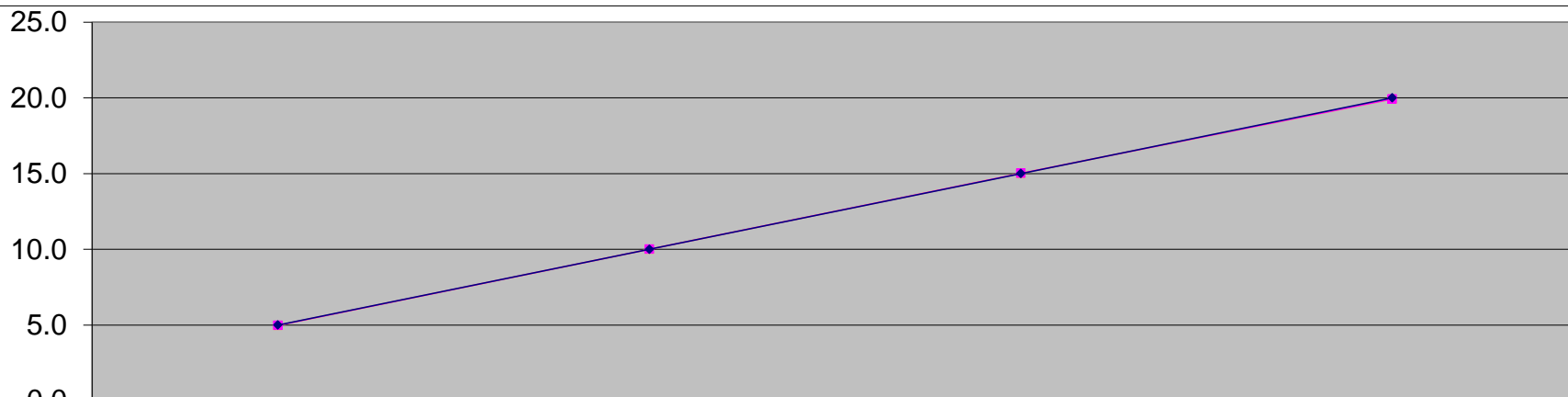
Certificate Number: 2023-035

Page: 11 of 16

Powder Feeder:	9MP-CL	Serial Number:	A9MPCL20050901-1	Scale Rate:	Flow is in SCFH	Full Scale [FS]:	21.2 Scfh	Type of Gas:	Nitrogen
Device ID Number:	PTS 166	Booth Number:	1						
Device Under Test:	Porter Mass Flow Cntr.	Device S/N:	3467240102001						

Testing Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411
---------------------	----------------	-----	----------------	--------

SCFH Set Point	SCFH Indicated On Display	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerance Pass/Fail	As Left Actual SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerance Pass / Fail
5	5	5.0	0.0	-0.2	Pass	5.0	0.0	-0.2	Pass
10	10	10.0	0.0	0.0	Pass	10.0	0.0	0.0	Pass
15	15	15.0	0.0	0.1	Pass	15.0	0.0	0.1	Pass
20	20	19.9	-0.1	-0.4	Pass	19.9	-0.1	-0.4	Pass

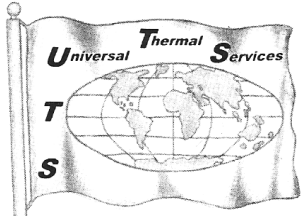


	1	2	3	4
▲ Flow SCFH As Found	5.0	10.0	15.0	19.9
■ Flow SCFH As Left	5.0	10.0	15.0	19.9
◆ Set Point SCFH	5	10	15	20

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24  
Signature: *Allen R. Hildebrand*

**All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!**



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Thermal

## Vibrator Air Pressure-Plasma #2 9MP-CL

Form Number: F-315-026 Rev. L 16-Oct-18

Page 12 of 16

Certificate Number: 2023-035

Powder Feeder #2:	9MP-CL	Serial Number:	A9MPCL20071019-1
Device ID Number:	PTS 169	Booth Number:	1
Device Under Test:	Vibrator EP2	Device S/N:	N/A

Testing Instrument:	Multi Meter	87-V	Serial Number:	MM-7	Testing Instrument:	Press. Transducer	PV350	Serial Number:	PM-22
---------------------	-------------	------	----------------	------	---------------------	-------------------	-------	----------------	-------


Pressure Full Scale = 60 PSI

Pressure (PSI) Set Point	As Set Gauge Setting	As Found NIST Pressure	As Found PSI Deviation	As Found PSI % of Deviation	Tolerances Pass/Fail	As Left NIST Pressure	As Left PSI Deviation	As Left PSI % Deviation	Tolerances Pass/Fail
10	9.9	10.1	0.1	0.2	Pass	10.1	0.2	0.3	Pass
20	20.1	20.3	0.3	0.5	Pass	20.3	0.2	0.3	Pass
30	29.9	30.4	0.4	0.7	Pass	30.4	0.5	0.8	Pass
40	39.4	40.4	0.4	0.7	Pass	40.4	1.0	1.7	Pass
50	50.0	50.9	0.9	1.5	Pass	50.9	0.9	1.5	Pass

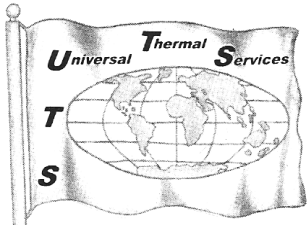
Weight Set:	Set 1	Serial Numbers:	
Sizes:	1Kg, 3Kg, 4Kg, 5Kg, 5Kg	3NGF	
Next Calibration Due:	31-Aug-24	3NGF	
		3NGF	
		3NGF	
		3NGF	

Hopper Weight Test in Kg Weight Kilo Gram	NIST Hopper Kg Weight As Found	Hopper Kg Weight Deviation As Found	Hopper Kg Weight % of Deviation	NIST Hopper Kg Weight As Left	Hopper Kg Weight Deviation As Found	Hopper Kg Weight % of Deviation
1.00	1.00	0.00	0.00	1.00	0.00	0.00
2.00	2.00	0.00	0.00	2.00	0.00	0.00
4.00	4.00	0.00	0.00	4.00	0.00	0.00
5.00	5.00	0.00	0.00	5.00	0.00	0.00
10.00	10.00	0.00	0.00	10.00	0.00	0.00
15.00	15.01	0.01	0.07	15.01	0.01	0.07

Hopper Pressure Command	Hopper Pressure Displayed As Found	Hopper Pressure NIST Manometer	Hopper Pressure NIST As Left [2nd]
Low: 42	34	42	42
High: 334	334	334	334

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23  
Calibration Due: 5-Dec-24  
Signature: 

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therma

## Argon Carrier Gas Flow-Plasma #2 9MP-CL

Form Number: F-315-026 Rev.

L 16-Oct-18

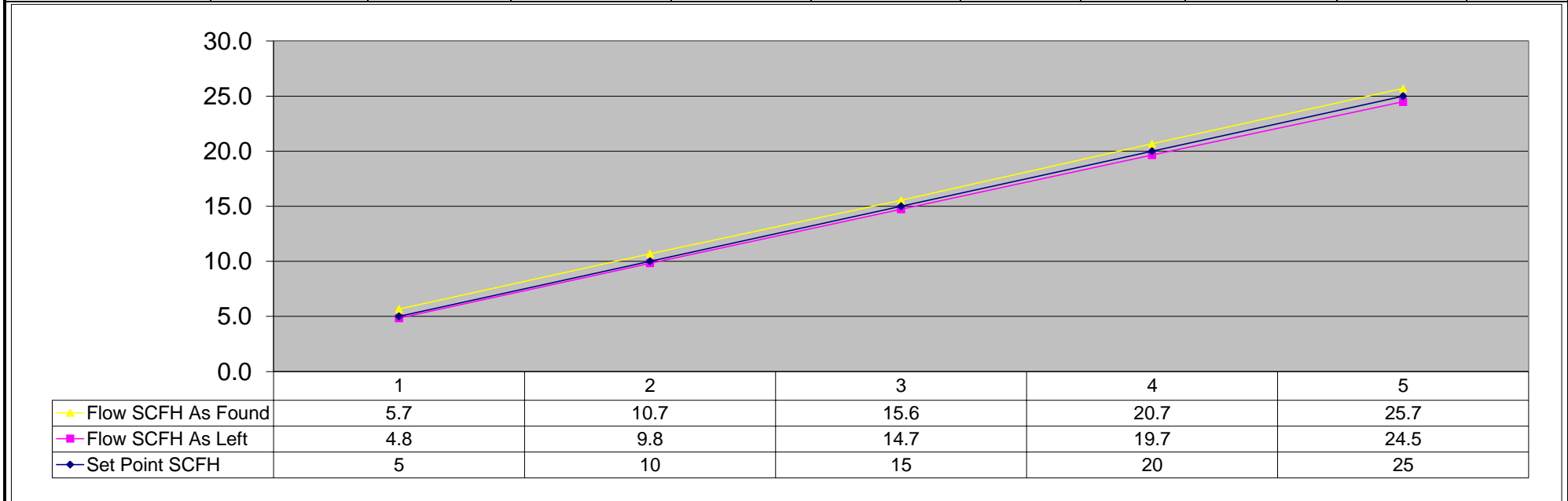
Certificate Number: 2023-035

Page: 13 of 16

Powder Feeder #2:	9MP-CL	Serial Number:	A9MPCL20071019-1		
Device ID Number:	PTS 169	Booth Number:	1		
Device Under Test:	Porter Mass Flow Cntr.	Device S/N:	N/A	Scale Rate:	Flow is in SCFH
			Flow Range:	0-29.7 SCFH	Type of Gas: Argon

Testing Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411	
---------------------	----------------	-----	----------------	--------	--

SCFH Set Point	SCFH Indicated On Display	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerance Pass / Fail	Adjusted		As Left SCFH % Deviation	Tolerance Pass / Fail
						As Left Actual SCFH	As Left SCFH Deviation		
5	5	5.7	0.7	2.3	Alert	4.8	-0.2	-0.5	Pass
10	10	10.7	0.7	2.3	Alert	9.8	-0.2	-0.6	Pass
15	15	15.6	0.6	1.9	Pass	14.7	-0.3	-0.9	Pass
20	20	20.7	0.7	2.3	Alert	19.7	-0.4	-1.2	Pass
25	25	25.7	0.7	2.3	Alert	24.5	-0.5	-1.8	Pass

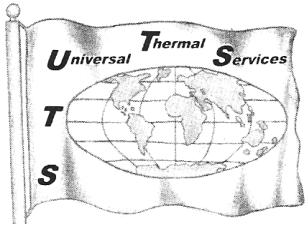


Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature: *Allen R. Hildebrand*

**All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!**



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone -- Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therma

## Nitrogen Carrier Gas Flow-Plasma #2 9MP-CL

Form Number: F-315-026 Rev. L 16-Oct-18

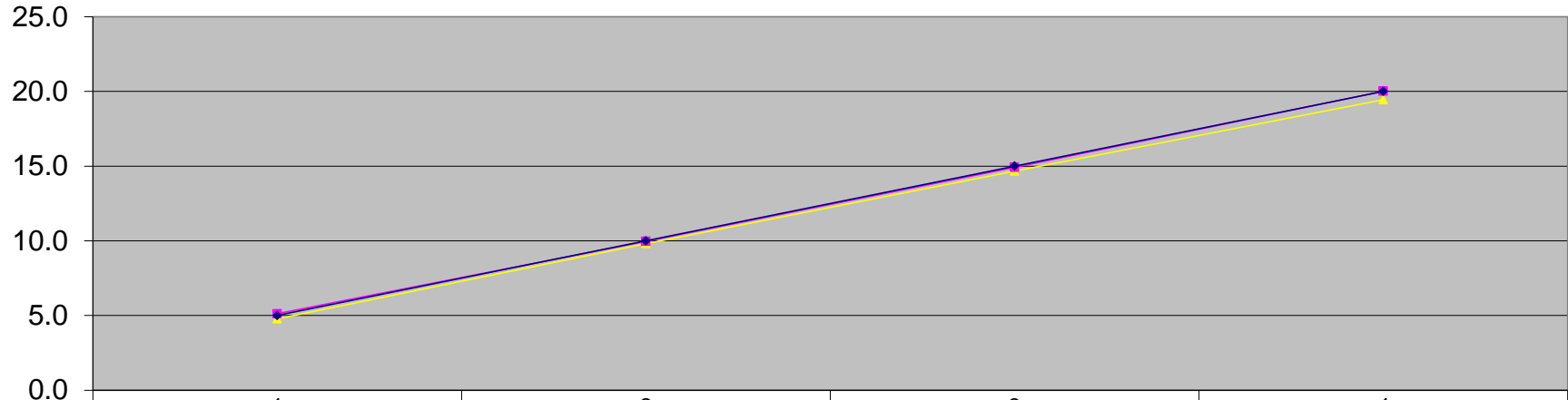
Certificate Number: 2023-035

Page: 14 of 16

Powder Feeder #2:	9MP-CL	Serial Number:	A9MPCL20071019-1		
Device ID Number:	PTS 169	Booth Number:	1		
Device Under Test:	Porter Mass Flow Cntr.	Device S/N:	N/A	Scale Rate:	Flow is in SCFH
				Full Scale [FS]:	21.2 Scfh
				Type of Gas:	Nitrogen

Testing Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411	
---------------------	----------------	-----	----------------	--------	--

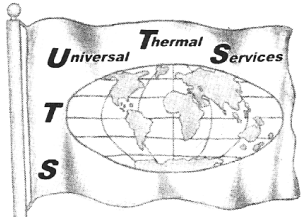
SCFH Set Point	SCFH Indicated On Display	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerance Pass/Fail	Adjusted		As Left SCFH Deviation	As Left SCFH % Deviation	Tolerance Pass / Fail
						As Left Actual SCFH	As Left SCFH Deviation			
5	5	4.8	-0.2	-1.1	Pass	5.1	0.1	0.6	Pass	
10	10	9.8	-0.2	-0.9	Pass	10.0	0.0	-0.1	Pass	
15	15	14.7	-0.3	-1.6	Pass	14.9	-0.1	-0.4	Pass	
20	20	19.5	-0.6	-2.6	Alert	20.0	0.0	0.1	Pass	



	1	2	3	4
Flow SCFH As Found	4.8	9.8	14.7	19.5
Flow SCFH As Left	5.1	10.0	14.9	20.0
Set Point SCFH	5	10	15	20

Calibrated By:	Allen Hildebrand	Calibration Due:	5-Dec-24	Signature:
Calibrated Date:	5-Dec-23			

**All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!**



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone – Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Thermal

## Vibrator Air Pressure-HVOF #1 9MP-DJ-CL

Form Number: F-315-026 Rev. L 16-Oct-18

Certificate Number: 2023-035

Page 15 of 16

Powder Feeder #2:	9MPE-DJ-CL	Serial Number:	A9MPEDJCL2030908-1
Device ID Number:	PTS 168	Booth Number:	1
Device Under Test:	Vibrator EP2	Device S/N:	N/A

Testing Instrument:	Multi Meter	87-V	Serial Number:	MM-7	Testing Instrument:	Press. Transducer	PV350	Serial Number:	PM-22
---------------------	-------------	------	----------------	------	---------------------	-------------------	-------	----------------	-------

Pressure Full Scale = 60 PSI

Pressure (PSI) Set Point	As Set Gauge Setting	As Found NIST Pressure	As Found PSI Deviation	As Found PSI % of Deviation	Tolerances Pass/Fail	As Left NIST Pressure	As Left PSI Deviation	As Left PSI % Deviation	Tolerances Pass/Fail
10	9.5	10.7	0.7	1.2	Reference Only	10.7	0.7	1.2	Reference Only
20	20.1	21.4	1.4	2.3	Reference Only	21.4	1.4	2.3	Reference Only
30	30.2	31.9	1.9	3.2	Reference Only	31.9	1.9	3.2	Reference Only
40	40.4	42.8	2.8	4.7	Reference Only	42.8	2.8	4.7	Reference Only
50	50.3	53.4	3.4	5.7	Reference Only	53.4	3.4	5.7	Reference Only

Not adjustable with Current Interface to Metco MultiCoat

The Vibrator is used only to keep powder flowing down to where the pickup shaft can suck it into the gas steam.

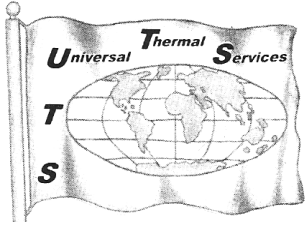
Weight Set:	Set 1	Serial Numbers:
Sizes:	1Kg, 3Kg, 4Kg, 5Kg, 5Kg	3NGF
Next Calibration Due:	31-Aug-24	3NGF
		3NGF
		3NGF

Hopper Weight Test in Kg Weight Kilo Gram	NIST Hopper Kg Weight As Found	Hopper Kg Weight Deviation As Found	Hopper Kg Weight % of Deviation	NIST Hopper Kg Weight As Left	Hopper Kg Weight Deviation As Found	Hopper Kg Weight % of Deviation
1.00	1.00	0.00	0.00	1.00	0.00	0.00
2.00	2.00	0.00	0.00	2.00	0.00	0.00
4.00	4.00	0.00	0.00	4.00	0.00	0.00
5.00	5.00	0.00	0.00	5.00	0.00	0.00
10.00	10.00	0.00	0.00	10.00	0.00	0.00
15.00	14.99	-0.01	-0.07	14.99	-0.01	-0.07

Hopper Pressure Command	Hopper Pressure Displayed As Found	Hopper Pressure NIST Manometer	Hopper Pressure NIST As Left [2nd]
Low: 42	Not Calibrated		
High: 334			

Calibrated By:	Allen Hildebrand	Calibration Due:	5-Dec-24
Calibrated Date:	5-Dec-23	Signature:	<i>Allen R. Hildebrand</i>

All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



Service  
Training  
Calibration  
Certification  
Maintenance

Universal Thermal Services  
Allen R. Hildebrand (President)  
E7064 Knopp Road  
Manawa, Wisconsin 54949  
Phone -- Fax 920-596-2983  
uts@wolfnet.net

Customer: Universal Therma

## Nitrogen Carrier Gas Flow-HVOF #1 9MP-DJ-CL

Form Number: F-315-026 Rev. L 16-Oct-18

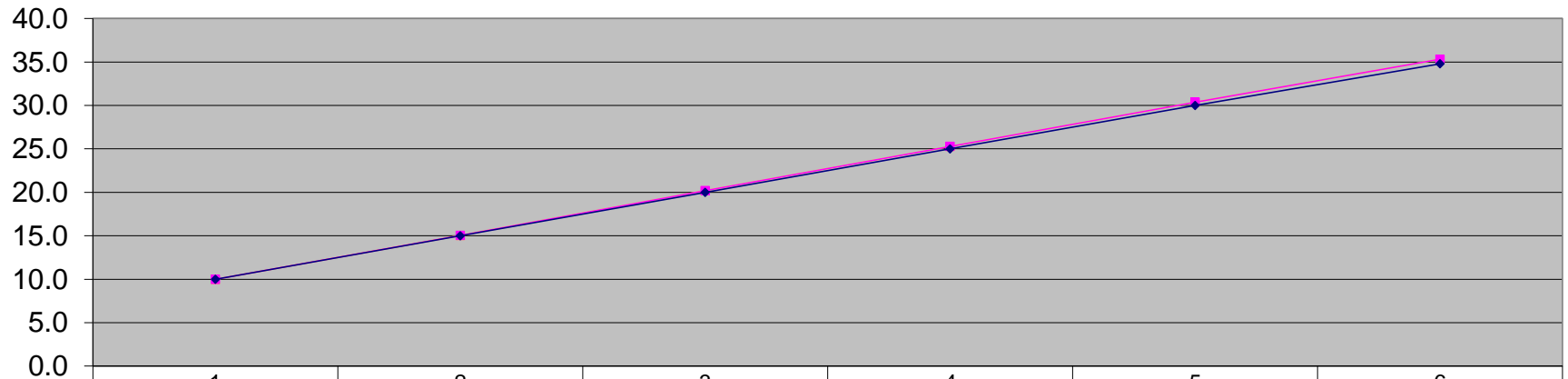
Certificate Number: 2023-035

Page: 16 of 16

Powder Feeder #2:	9MPE-DJ-CL	Serial Number:	A9MPEDJCL2030908-1		
Device ID Number:	PTS 168	Booth Number:	1		
Device Under Test:	Porter Mass Flow Cntr.	Device S/N:	M8209620B	Scale Rate:	Flow is in SCFH
		Full Scale [FS]:	37.8 Scfh	Type of Gas:	Nitrogen

Testing Instrument: Alicat 75 scfh PCU Serial Number: 299411

SCFH Set Point	SCFH Indicated On Display	As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerance Pass/Fail	As Left Actual SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerance Pass / Fail
10	10	10.0	0.0	-0.1	Pass	10.0	0.0	-0.1	Pass
15	15	15.0	0.0	0.1	Pass	15.0	0.0	0.1	Pass
20	20	20.2	0.2	0.5	Pass	20.2	0.2	0.5	Pass
25	25	25.3	0.3	0.8	Pass	25.3	0.3	0.8	Pass
30	30	30.4	0.4	1.0	Pass	30.4	0.4	1.0	Pass
35	34.8	35.3	0.5	1.3	Pass	35.3	0.5	1.3	Pass



	1	2	3	4	5	6
▲ Flow SCFH As Found	10.0	15.0	20.2	25.3	30.4	35.3
■ Flow SCFH As Left	10.0	15.0	20.2	25.3	30.4	35.3
◆ SCFH Set Point	10	15	20	25	30	34.8

Calibrated By: Allen Hildebrand  
Calibrated Date: 5-Dec-23

Calibration Due: 5-Dec-24

Signature: *Allen R. Hildebrand*

**All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!**