

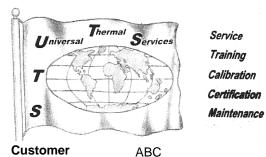
Service Training Calibration Certification Maintenance

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

## Metco 9MC Plasma Certificate of Calibration

9MC Rev P 2/18/2009 Form #

Cert. No.:	2009-922							Pa	<b>ge:</b> 1 of 7
Customer:	ABC	Console:	Metco 9MC	Powder Feeder	9MP	Distrubtion Box	9MCD		
Address:	1365 Newton	S/N:	9MP AM9255935-4	Serial Number:	9MP EM94169318-1	Serial Number:	N/A		
City:	Boucherville	Device ID#:	M-140						
State:	Quebec	Booth #:	#4	Powder Feeder					
Zip:	J4B 5H2	Calibration As Received		Serial Number:		Power Supply	9MR		
Name:	John	With in 3%:	No			Serial Number:	KD350778		
Phone #:	451-449-4612	Adjustments:	Yes						
		N.I.S.T. Instru	uments Used fo	r This Calibra	ition				
<b>T</b>		<b>T</b>	NA 1/2 NA /	<b>T</b>		<b>T</b>		1	
Test Inst:	Press. Transducer	Test Inst:	Multi Meter	Test Inst:	Amp Clamp Meter	Test Inst:			
Make:	Fluke	Make:	Fluke	Make:	Fluke	Make:			
Model:	PV350	Model:	87V	Model:	i1010	Model:			
Serial No:	107	Serial No:	88190113	Serial No:	91562357	Serial No:			
Next Cal. Due:	1/6/2010	Next Cal. Due:	6/27/2009	Next Cal. Due:	3/11/2009	Next Cal. Due:			
Test Inst: Low Flow	Mass Flow Meter	Test Inst: Medium Flow	Mass Flow Meter						
Make:	Alicat Scientific 0-75 scfh	Make:	Alicat Scientific 0-400 scfh						
Model:	PUC-50SLPM	Model:	PUC-250SLPM						
Serial No:	44770	Serial #:	44771						
Next Cal. Due:	1/13/20010	Next Cal. Due:	1/13/20010						
Next Gal. Due.	1/13/20010	Next Gal. Due.	1/13/20010						
Flow Tube	Accuracy	Tube Pressure	Tube Scale	Scfh Per Metco					
Argon flow meter	± 3%	75 psi	0-300 scfh	296					
Hydrogen flow meter	± 3%	50 psi	0-42 scfh	42					
Helium flow meter	± 3%	75 psi	0-42 scm	225					
Nitrogen flow meter	± 3%	75 psi	0-300 scfh	353					
Nitiogen now meter	± 5 %	75 þ5i	0-300 Selli	555					
	System Performa	nce w/Parameters	as Provided by the	Operator Initially					
Gas	Pressure	Gas [Ball] Flow	<b>,</b>	Amps	Volts As Found				
Ar	75	120	System	450	58.7				
H2	50	15	Gun Type		Volts As Left				
N2			3MB		56.1				
Не									
Neters									
Notes: Console Air Purge Safety Test:	Pass	Coution Lowered 4t - A	rgon and H2 flows by 5% or	This mode for a 2.7 ····					
		Caution: Lowered the A	rgon and H2 flows by 5% of	This made for a 2.7 vo	it cooler parameter.				
Door Switch Safety Test:	Pass								
Argon Supply Test:	Pass	Air vibrator Gauges are	not used and for reference	only.					
Hydrogen Supply Test:	Pass								
Nitrogen Supply Test:	N/A								
Helium Supply Test:	N/A								Acceptable
E-Stop Console:	Pass				,			• •	-5% Alert
					R Hildebard	1		Red 5.1 a	and up Fail
Oslikestad Der		1		Cons	K dittle	61			
Calibrated By:	Allen Hildebrand	Next Celibration During	10/16/2000	Isimutum (Illen	11- Hudeland	/			
Calibrated Date:	4/16/2009	Next Calibration Due:	10/16/2009	Signature:	,				



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

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Cert. No.	2009-922						Form #	9MC Rev P Page:	2/18/2009
Console:	Metco 9MC		Serial Number:	9MP AM9255935-4		Booth :	#4	I age.	2 01 7
Testing Instrument:	Press. Transducer	PV350	Serial Number:	107	Testing Instrument:	Multi Meter	87V	Serial Number:	88190113
			Vik	orator Air	#1 Fc	or Reference O	nly		
Device Under Test:	Vibrator #1 Gauge	Pre	ssure Full Scale [FS]	60 PSI		Device ID #:			
Pressure (PSI)	Gauge	NIST	Actual PSI	PSI %	As Left	As Left	As Left		
Set Point	Reading	Pressure	Deviation	Deviation	Gauge Reading	PSI Deviation	PSI % Deviation	<u> </u>	
10									
20									
30									
40									
50									
60									
			Vik	orator Air	#2 Fc	or Reference O	nly		
Device Under Test:	Vibrator #2 Gauge	Pre	ssure Full Scale [FS]	60 PSI		Device ID #:			
Dec	0	NICT	A study DOI	DOI 0/	A = 1 = 41	A = 1 = 4	A = 1 = 44	<del></del>	
Pressure (PSI)	Gauge	NIST	Actual PSI	PSI %	As Left	As Left	As Left		
Set Point	Reading	Pressure	Deviation	Deviation	Gauge Reading	PSI Deviation	PSI % Deviation	+	+
10								+	-
20								+	
30								+	+
40							-		+
50							-		+
60									
			С	ooling Ai	r				
Device Under Test:	Cooling Air Gauge	Pre	essure Full Scale [FS]	120 PSI	_	Device ID #:			
Pressure (PSI)	Gauge	NIST	Actual PSI	PSI %	As Left	As Left	As Left		
Set Point	Reading	Pressure	Deviation	Deviation	Gauge Reading	PSI Deviation	PSI % Deviation		
20	20	20.0	0.0	0.0	20.0	0.0	0.0		
40	40	40.0	0.0	0.0	40.0	0.0	0.0		
60	60	59.5	-0.5	-0.4	59.5	-0.5	-0.4		
80	80	78.5	-1.5	-1.3	78.5	-1.5	-1.3		
100	100	98.6	-1.4	-1.2	98.6	-1.4	-1.2		
120									
					in R Hildeba	Λ			
Calibrated By:	Allen Hildebrand	1		Con	1. 12 ATTUCK	Jel .			
Calibrated By:	4/16/2009	Next Calibration Due:	10/16/2009	Signature:	en 1º mada	nd			
eansiatoa pato.	7/10/2003	I NEAL GAIIDI ALION DUE.	10/10/2003						

Air Gauges

Universal T S	Services	Service Training Calibration Certification Maintenance					Universal T Allen R. Hi E7064 Knog Manawa, W Phone – Fax uts@ wolfn	ldebrand (P pp Road Visconsin 54 x 920-596-2	resident) 949
Customer:	ABC		G	as Gaug	es				
			-				Form #	9MC Rev P	2/18/2009
Cert. No. :	2009-922							Page:	3 of 7
Console:	Metco 9MC		Serial Number:	9MP AM9255935-4		Booth :	#4		
Testing Instrument:	Press. Transducer	PV350	Serial Number:	107	Testing Instrument:	Multi Meter	87V	Serial Number:	88190113
			Primary G	as Press	ure Gauge				
Device Under Test:	Arc Gas Gauge		Pressure Full Scale [FS]	100 PSI		Device ID #:			
Pressure (PSI)	Gauga	NIST	Actual PSI	PSI %	As Left	As Left	As Left		
Set Point	Gauge Reading	Pressure	Deviation	Deviation	As Left Gauge Reading	AS Left PSI Deviation	AS Left PSI % Deviation		
40	40	39.6	-0.4	-0.4	39.6	-0.4	-0.4		
50	50	50.1	0.1	0.1	50.1	0.1	0.1		
60	60	60.3	0.3	0.3	60.3	0.3	0.3		
70	70	70.1	0.1	0.1	70.1	0.1	0.1		
80	80	80.0	0.0	0.0	80.0	0.0	0.0		
90	Max								
100									
	-								
Device Under Test:	Sec. Gas Gauge		Secondar Pressure Full Scale [FS]	y Gas Pro	essure Gau	<b>Ge</b> Device ID #:			
Pressure (PSI)	Gauge	NIST	Actual PSI	PSI %	As Left	As Left	As Left		
Set Point	Reading	Pressure	Deviation	Deviation	Gauge Reading	PSI Deviation	PSI % Deviation		
40	40	40.0	0.0	0.0	40.0	0.0	0.0	<u>├</u>	1
50	50	50.0	0.0	0.0	50.0	0.0	0.0	1 1	
60	60	59.5	-0.5	-0.5	59.5	-0.5	-0.5		
70	70	69.6	-0.4	-0.4	69.6	-0.4	-0.4	1 1	
80	80	79.6	-0.4	-0.4	79.6	-0.4	-0.4		
90	90	89.6	-0.4	-0.4	89.6	-0.4	-0.4		
100	100	98.8	-1.2	-1.2	98.8	-1.2	-1.2		
Calibrated By: Calibrated Date:	Allen Hildebrand 4/16/2009	Next Calibration	Due: 10/16/2009	Signature: all	len R Hildeba	rd			

Universal T S	Services Cerri Calib.	ing					Universal T Allen R. Hi E7064 Kno Manawa, W Phone – Fa: uts@ wolfn	ldebrand (I pp Road Visconsin 5- x 920-596-2	President) 4949
Customer:	ABC		Amperage	and Vo	Itage Meter				
							Form #		
Cert. No. :	2009-922					5 (1		Page	<b>e:</b> 4 of 7
Console: Device ID #:	Metco 9MC		Serial Number:	9MP AM9255935	-4	Booth :	#4		
_									
Testing Instrument:	Amp Clamp Meter	i1010	Serial Number:	91562357	Testing Instrument:	Multi Meter	87V	Serial Number:	88190113
Device Under Test:	Digital Amp Meter		Amps Full Scale [FS]	2000 mp					
Amps	Meter	NIST	Actual Amps	% Amps	As Left	As Left Amps	As Left		<u> </u>
Set Point	Reading	Meter	Deviation	Deviation	Meter Reading	Deviation	% Amps Deviation		
300	300	300.0	0.0	0.0	300.0	0.0	0.0		
400	400	404.0	4.0	0.2	404.0	4.0	0.2		
500	500	508.0	8.0	0.4	508.0	8.0	0.4		
600	600	610.0	10.0	0.5	610.0	10.0	0.5		
700	700	713.0	13.0	0.7	713.0	13.0	0.7		
800	800	815.0	15.0	0.8	815.0	15.0	0.8		
900									
1000									
			V	olt Met	er				
Device Under Test:	Digital Volt Meter		Volts Full Scale [FS]	200					
Volt Meter	Meter	NIST	Volts	% Volts	Volts As Left	As Left	As Left	1	
Set Point	Reading	Meter	Deviation	% voits Deviation	Meter Reading	As Left Volts Deviation	% Volts Deviation		
36	36	36.0	0.0	0.0	36.0	0.0		+ +	
40	40	40.0	0.0	0.0	40.0	0.0	0.0	+ +	
40	+0	40.0	0.0	0.0	40.0	0.0	0.0	1	

0.0

0.0

0.0

50.0

60.0

70.1

0.0

0.0

0.1

0.0

0.0

0.0

					RIANI
Calibrated By:	Allen Hildebrand				(M. R Hullbard
Calibrated Date:	4/16/2009	Next Calibration Due:	10/16/2009	Signature:	allen 1 11 all and

0.0

0.0

0.1

**Amps** 450

Volts

56

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

50.0

60.0

70.1

15

System Performance w/Parameters after Calibration Gas [Ball] Flow 120

50

60

70

Gas Ar

H2

N2

He

50

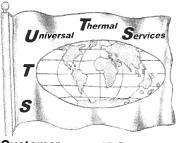
60

70

Pressure

75

50



Service Training Calibration Certification Maintenance

Customer: ABC

Calibrated Date:

4/16/2009

## Hydrogen Flow

Tube Scale 0-42 @ 50 psi H2 @ 70°F

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

9MC Rev

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2/18/2009

Form #

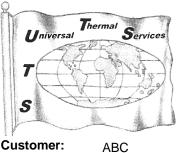
## 2009-922 Cert. No: Page: 5 of 7 Console: Serial Number: 9MP AM9255935-4 Metco 9MC Type of Gas: Hydrogen Full Flow SCFH [FS]: 42 Device ID #: Booth : #4 Device Under Test: Secondary Gas Flow Tube Scale Rate: Flow is in SCFH Mass Flow Meter Alicat Scientific 0-75 scfh Serial Number: Testing Instrument: 44770 Metco Flow Tube Metco Flow Tube As Found As Found Actual As Found SCFH As Left As Left As Left SCFH Previous SCFH Set Point SCFH Converted Actual SCFH Actual SCFH SCFH Deviation % Deviation SCFH Deviation % Deviation SCFH 5.0 0.0 0.0 5 7.6 2.6 6.1 5 10 10 12.6 2.6 6.1 9.9 -0.1 -0.2 0.0 15 15 17.5 2.5 5.9 15.0 -0.1 20 22.2 20.0 0.0 20 2.2 5.1 -0.1 25 25 27.1 2.1 5.0 25.4 0.4 0.9 30 30 31.8 1.8 4.3 30.1 0.1 0.3 4.0 35 35 36.7 1.7 34.8 -0.2 -0.5 40 40 41.4 1.4 32 40.0 0.0 0.0 45.0 40.0 35.0 30.0 25.0 20.0 15.0 10.0 5.0 0.0 2 3 5 6 7 8 1 4 Flow SCFH As Found 7.6 12.6 17.5 22.2 27.1 31.8 36.7 41.4 -Flow SCFH As Left 5.0 15.0 25.4 34.8 9.9 20.0 30.1 40.0 SCFH Target Values 5 10 15 20 25 30 35 40 Adjusted over 5% Calibrated By: Allen Hildebrand

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

10/16/2009

Signature:

Next Calibration Due:



Service Training Calibration Certification Maintenance

**Customer:** 

## **Argon Flow**

Tube Scale 0-300 @ 75 psi Ar @ 70°F

9MC Rev 2/18/2009 Form # Р **D**-~ ~ 7

Universal Thermal Services

Manawa, Wisconsin 54949

Phone - Fax 920-596-2983

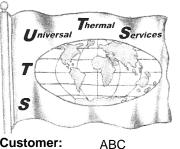
E7064 Knopp Road

uts@ wolfnet.net

Allen R. Hildebrand (President)

Cert. No: Console:								Page	: 6 of 7
	2009-922 Metco 9MC	Serial Number:	9MP AM9255935-4	Type of Gas:	Argon	Full Flow SCFH [FS]:	296		
evice ID #:		Booth:	#4	ijpe e. euci	7 il goli		200		
Device Under Test:	Primary Gas Flow Tube			Scale Rate:	Flow is in SCFH				
esting Instrument:	Mass Flow Meter	Alicat Scientific 0-400 scfh	Serial Number:	PUC-250SLPM					
Metco Flow Tube	Metco Flow Tube		As Found	As Found Actual	As Found SCFH	As Left	As Left	As Left SCFH	Previou
SCFH Set Point	SCFH Converted		Actual SCFH	SCFH Deviation	% Deviation	Actual SCFH	SCFH Deviation	% Deviation	SCFH
60	60		79.9	19.9	6.7	62.5	2.5	0.8	
90	90		110.6	20.6	7.0	91.8	1.8	0.6	
120	120		138.2	18.2	6.1	120.1	0.1	0.0	
150	150		170.0	20.0	6.8	152.6	2.6	0.9	
180	180		198.6	18.6	6.3	181.9	1.9	0.6	
210	210		238.0	28.0	9.5	210.1	0.1	0.0	
240	240		257.5	17.5	5.9	237.9	-2.1	-0.7	
270	270		285.5	15.5	5.2	263.6	-6.4	-2.2	
	150.0				•				
	100.0								
	100.0				4				
	100.0 50.0 0.0	1 2	3		4 5		7	8	
Flow SCF	100.0 50.0 0.0	1 2 9.9 110.6	3 138		4 5 '0.0 198		7 257.5	8 285.	5
Flow SCF	100.0 50.0 0.0 H As Found 7			.2 17		8.6 238.0			
	100.0 50.0	1 2	3		4 5	5 6	7	8	

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

Customer:

**Helium Flow** 

Universal Thermal Services

Manawa, Wisconsin 54949

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E7064 Knopp Road

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Allen R. Hildebrand (President)

Tube Scale 0-225 @ 75 psi He @ 70°F Form # 9MC Rev Р 2/18/2009 Cert. No: 2009-922 Not Used For Reference Only Page: 7 of 7 Type of Gas: Console: Metco 9MC Serial Number: 9MP AM9255935-4 Helium Full Flow SCFH [FS]: 225 Device ID #: Booth: #4 Secondary Gas Flow Tube Flow is in SCFH Device Under Test: Scale Rate: Testing Instrument: Mass Flow Meter Serial Number: PUC-250SLPM Multi Meter 87V Serial Number: 88190113 Testing Instrument: Alicat Scientific 0-400 scfh Metco Flow Tube Metco Flow Tube As Found As Found Actual As Found SCFH As Left As Left As Left SCFH Previous SCFH Set Point SCFH Converted Actual SCFH SCFH Deviation % Deviation Actual SCFH SCFH Deviation % Deviation SCFH 20 40 60 80 100 120 140 160 180 1.2 1.0 0.8 0.6 0.4 0.2 0.0 2 1 3 4 5 6 7 8 9 Flow SCFH As Found -Flow SCFH As Left SCFH Target Values Calibrated By: Allen Hildebrand Signature: Calibrated Date: 4/16/2009 Next Calibration Due: 10/16/2009