

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

## Miller Thermal 3620 Certificate of Calibration

Form # 3620 Rev.

Q 4/21/2009

Cert. No. : 2009-031

Page: 1 of 10

Customer: ABC	Console: Miller 3620	Hopper: 1262	Power Supply: PS100
Address: 1365 Newton	S/N: KB26001B	S/N: KC560100	S/N: KB152577
City: Boucherville	Device ID#: M-146		
State: QU	Booth #: Booth #1	Hopper: S/N:	
Zip: J4B 5H2	With in 3%: No		
Name: John	Adjustments: Yes		
Phone #: 451 449 4612			

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

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		Console Air Purge Safety Test: N/A
Make: Alicat Scientific 0-75 scfh	Make: Alicat Scientific 0-400 scfh		Door Switch Safety Test: Pass
Model: PUC-50SLPM	Model: PUC-250SLPM		Argon Supply 30-35 psi Test: 18 psi
Serial No: 44770	Serial #: 44771		System Checked for Gas Leaks: Pass
Next Cal. Due: 1/13/20010	Next Cal. Due: 1/13/20010		Hopper Back Psi Safety 25 psi: Pass

Gas Orifices	Sizes	Gas	Flow [FS]
Primary Gas	#56	Argon	511.12
Secondary Gas	#80	Helium	110.28
Secondary Gas	#97 or #103	Hydrogen	31.43 or 7.34
Powder Carrier Gas	#77	Argon or Nitrogen	46.2 or 50.2

[Optional Information]

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

Gas	Pressure	Gun	Amps	Volts	Volts As Left	Evidence of Gas Contamination		
Ar	40	SG100				Argon:		No
H2		Amps				Helium:		No
N2		950				Hydrogen:		N/A
He	220	Volts				Nitrogen:		N/A
		46.1			44.9	Air:		N/A

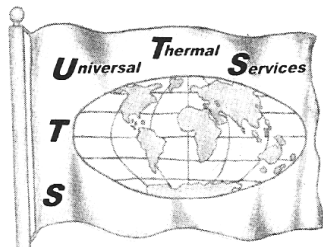
**Notes:**

Helium Orifice failed and has been replaced. As Left values are from the new orifice.

Green 0-3% Acceptable  
 color: orange;">Orange 3.1-5% Alert  
 color: red;">Red 5.1 and up Fail

Calibrated By: Allen Hildebrand	Calibrated Date: 4/20/2009	Next Calibration Due: 10/20/2009	Signature: <i>Allen R. Hildebrand</i>
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All instruments have been calibrated against standards traceable to NIST. This Certification Sheet must not be altered in any way!



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Customer: ABC

## Amperage Display

Form # 3620 Rev. Q 4/21/2009

Cert. No. : 2009-031

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Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	Amp Meter	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Amp Clamp Meter	i1010	Serial Number:	91562357
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Pressure Full Scale [FS] = 1500 Amps

Amps Set Point	As Found Display Reading	As Found NIST Meter	Actual Amps Deviation	As Found Amps % Deviation	As Left Display Reading	As Left Amps Deviation	As Left Amps % Deviation		
500	500	515	15.0	1.0	502	2.0	0.1		
600	600	617	17.0	1.1	602	2.0	0.1		
700	700	720	20.0	1.3	700	0.0	0.0		
800	800	822	22.0	1.5	798	-2.0	-0.1		
900	900	924	24.0	1.6	897	-3.0	-0.2		
1000	1000	1026	26.0	1.7	995	-5.0	-0.3		
								Adjusted	

## Volts Display

Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth #:	Booth #1
Device Under Test:	Volt Meter	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113
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Volts Full Scale [FS] = 200 Volts

Volt Meter Set Point	Meter Reading	NIST Meter	Volts Deviation	Volts % Deviation	Volts As Left Meter Reading	As Left Volt Deviation	As Left Volts % Deviation		
30	30	29.1	-0.9	-0.4	30.0	0.0	0.0		
36	36	35.0	-1.0	-0.5	36.0	0.0	0.0		
38	38	37.0	-1.0	-0.5	37.0	-1.0	-0.5		
40	40	39.0	-1.0	-0.5	39.0	-1.0	-0.5		
43	43	41.8	-1.2	-0.6	43.0	0.0	0.0		
45	45	43.8	-1.2	-0.6	45.1	0.1	0.1		
								Adjusted	

### System Performance w/Parameters as Provided by the Operator After Calibration

Gas	Pressure	Amps						
Ar	40	950						
H2		Volts						
N2		44.9						
He	220							

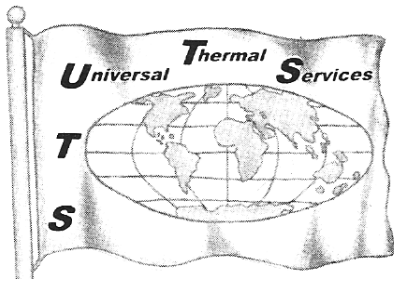
Calibrated By: Allen Hildebrand

Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

Signature: *Allen R. Hildebrand*

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## Arc Gas Gauge [P1]

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Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	Arc Gas P1	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 300 PSI

Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation		
10	10	19.0	9.0	3.0	19.0	9.0	3.0		
30	30	29.0	-1.0	-0.3	29.0	-1.0	-0.3		
50	50	49.2	-0.8	-0.3	49.2	-0.8	-0.3		
70	70	69.4	-0.6	-0.2	69.4	-0.6	-0.2		
90	90	89.4	-0.6	-0.2	89.4	-0.6	-0.2		
110	110	109.9	-0.1	0.0	109.9	-0.1	0.0		
130	130	129.5	-0.5	-0.2	129.5	-0.5	-0.2		
150	150	149.6	-0.4	-0.1	149.6	-0.4	-0.1		

## Arc Gas Pressure [P2]

Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	Arc Gas P2	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 160 PSI

Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation		
10	10	10.7	0.7	0.4	10.7	0.7	0.4		
30	30	30.7	0.7	0.4	30.7	0.7	0.4		
50	50	51.0	1.0	0.6	51.0	1.0	0.6		
70	70	70.9	0.9	0.6	70.9	0.9	0.6		
90	90	90.5	0.5	0.3	90.5	0.5	0.3		
110	110	110.5	0.5	0.3	110.5	0.5	0.3		
130	130	130.8	0.8	0.5	130.8	0.8	0.5		
150	150	150.6	0.6	0.4	150.6	0.6	0.4		

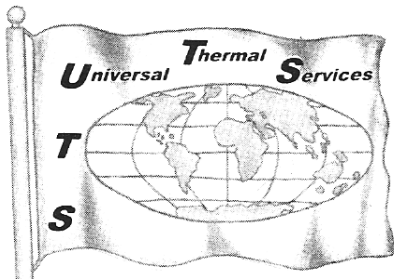
Calibrated By: Allen Hildebrand

Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

Signature: *Allen R. Hildebrand*

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## Aux Gas Gauge [P1]

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Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	Aux Gas P1	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 300 PSI

Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation			
10	10	9.9	-0.1	0.0	9.9	-0.1	0.0			
30	30	29.7	-0.3	-0.1	29.7	-0.3	-0.1			
50	50	49.2	-0.8	-0.3	49.2	-0.8	-0.3			
70	70	69.6	-0.4	-0.1	69.6	-0.4	-0.1			
90	90	89.6	-0.4	-0.1	89.6	-0.4	-0.1			
110	110	109.5	-0.5	-0.2	109.5	-0.5	-0.2			
130	130	129.4	-0.6	-0.2	129.4	-0.6	-0.2			
150	150	148.8	-1.2	-0.4	148.8	-1.2	-0.4			

## Aux Gas Pressure [P2]

Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	Aux Gas P2	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 160 PSI

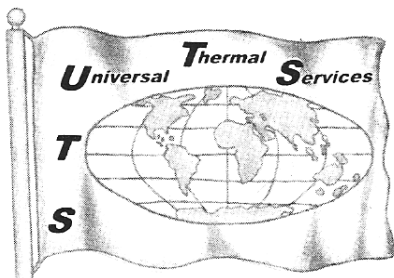
Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation			
10	10	10.1	0.1	0.1	10.1	0.1	0.1			
30	30	30.2	0.2	0.1	30.2	0.2	0.1			
50	50	50.1	0.1	0.1	50.1	0.1	0.1			
70	70	69.7	-0.3	-0.2	69.7	-0.3	-0.2			
90	90	89.5	-0.5	-0.3	89.5	-0.5	-0.3			
110	110	109.3	-0.7	-0.4	109.3	-0.7	-0.4			
130	130	129.8	-0.2	-0.1	129.8	-0.2	-0.1			
150	150	149.5	-0.5	-0.3	149.5	-0.5	-0.3			

Calibrated By:	Allen Hildebrand
Calibrated Date:	4/20/2009

Next Calibration Due:	10/20/2009
-----------------------	------------

Signature: *Allen R. Hildebrand*

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## #1 Carrier Gas Gauge [P1]

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Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	#1 Carrier Gas P1	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 200 PSI

Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation			
20	20	19.6	-0.4	-0.2	19.6	-0.4	-0.2			
30	30	29.8	-0.2	-0.1	29.8	-0.2	-0.1			
40	40	39.5	-0.5	-0.3	39.5	-0.5	-0.3			
50	50	49.4	-0.6	-0.3	49.4	-0.6	-0.3			
60	60	59.5	-0.5	-0.3	59.5	-0.5	-0.3			
70	70	69.4	-0.6	-0.3	69.4	-0.6	-0.3			
80	80	79.4	-0.6	-0.3	79.4	-0.6	-0.3			
90	90	89.9	-0.1	0.0	89.9	-0.1	0.0			

## #1 Carrier Gas Gauge [P2]

Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	#1 Carrier Gas P2	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 100 PSI

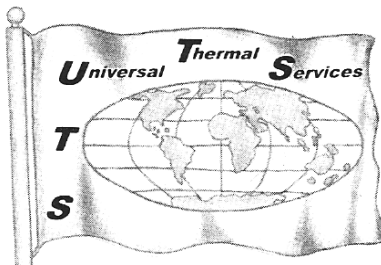
Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation			
10	10	10.4	0.4	0.4	10.4	0.4	0.4			
20	20	20.3	0.3	0.3	20.3	0.3	0.3			
30	30	30.2	0.2	0.2	30.2	0.2	0.2			
40	40	40.0	0.0	0.0	40.0	0.0	0.0			
50	50	49.8	-0.2	-0.2	49.8	-0.2	-0.2			
60	60	59.8	-0.2	-0.2	59.8	-0.2	-0.2			
70	70	69.8	-0.2	-0.2	69.8	-0.2	-0.2			
80	80	79.5	-0.5	-0.5	79.5	-0.5	-0.5			

Calibrated By:	Allen Hildebrand
Calibrated Date:	4/20/2009

Next Calibration Due:	10/20/2009
-----------------------	------------

Signature:

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## #2 Carrier Gas Gauge [P1]

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Cert. No. : 2009-031

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Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	#2 Carrier Gas P1	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 200 PSI

Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation			
20	20	20.8	0.8	0.4	20.8	0.8	0.4			
30	30	30.1	0.1	0.1	30.1	0.1	0.1			
40	40	39.9	-0.1	-0.1	39.9	-0.1	-0.1			
50	50	49.6	-0.4	-0.2	49.6	-0.4	-0.2			
60	60	49.8	-10.2	-5.1	49.8	-10.2	-5.1			
70	70	69.2	-0.8	-0.4	69.2	-0.8	-0.4			
80	80	78.8	-1.2	-0.6	78.8	-1.2	-0.6			
90	90	89.9	-0.1	0.0	89.9	-0.1	0.0			

## #2 Carrier Gas Gauge [P2]

Console:	Miller 3620	Serial Number:	KB26001B
Device ID #:	M-146	Booth Number:	Booth #1
Device Under Test:	#2 Carrier Gas P2	Device ID #:	

Testing Instrument:	Multi Meter	87V	Serial Number:	88190113	Testing Instrument:	Press. Transducer	PV350	Serial Number:	107
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Pressure Full Scale [FS] = 100 PSI

Pressure (PSI) Set Point	As Found Gauge Setting	As Found NIST Pressure	Actual PSI Deviation	As Found PSI% Deviation	As Left Gauge Setting	As Left PSI Deviation	As Left PSI % Deviation			
10	10	9.5	-0.5	-0.5	9.5	-0.5	-0.5			
20	20	19.2	-0.8	-0.8	19.2	-0.8	-0.8			
30	30	29.4	-0.6	-0.6	29.4	-0.6	-0.6			
40	40	39.7	-0.3	-0.3	39.7	-0.3	-0.3			
50	50	49.7	-0.3	-0.3	49.7	-0.3	-0.3			
60	60	59.4	-0.6	-0.6	59.4	-0.6	-0.6			
70	70	69.8	-0.2	-0.2	69.8	-0.2	-0.2			
80	80	79.6	-0.4	-0.4	79.6	-0.4	-0.4			

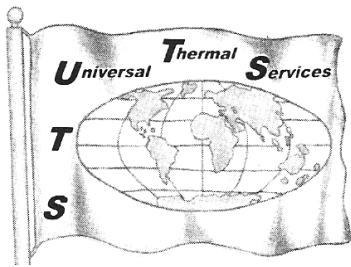
Calibrated By: Allen Hildebrand

Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

Signature: *Allen R. Hildebrand*

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## Argon Flow

Form # 3620 Rev. Q 4/21/2009

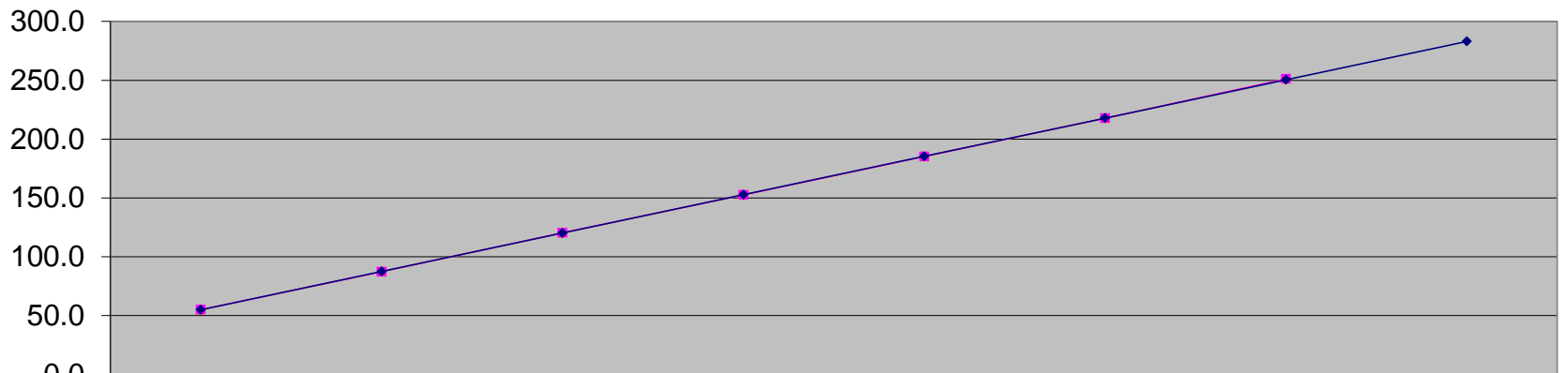
Cert. No: 2009-031

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Console:	Miller 3620	Serial Number:	KB26001B	Type of Gas:	Argon	Full Flow SCFH [FS]:	511.12
Device ID #:	M-146	Booth Number:	Booth #1				
Device Under Test:	Critical Orifice Flows	Critical Orifice:	#56	Scale Rate:	Flow is in SCFH	Device ID #:	

Testing Instrument: Mass Flow Meter Alicat Scientific 0-400 scfh Serial Number: 44771

Primary Arc Gas Gauge Set Point	Critical Orifices SCFH Converted	As Found SCFH Actual	As Found SCFH Deviation	SCFH % Deviation	As Left SCFH	As Left SCFH Deviation	As Left SCFH % Deviation
20	55.0	54.9	-0.1	0.0	54.9	-0.1	0.0
40	87.6	87.2	-0.4	-0.1	87.2	-0.4	-0.1
60	120.2	120.3	0.1	0.0	120.3	0.1	0.0
80	152.7	152.5	-0.2	0.0	152.5	-0.2	0.0
100	185.3	185.1	-0.2	0.0	185.1	-0.2	0.0
120	217.9	217.7	-0.2	0.0	217.7	-0.2	0.0
140	250.5	251.1	0.6	0.1	251.1	0.6	0.1
160	283.1						



	1	2	3	4	5	6	7	8
Scfh As Found	54.9	87.2	120.3	152.5	185.1	217.7	251.1	
Scfh As Left	54.9	87.2	120.3	152.5	185.1	217.7	251.1	
Scfh Set Points	55.0	87.6	120.2	152.7	185.3	217.9	250.5	283.1

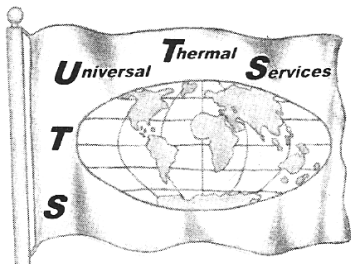
Calibrated By: Allen Hildebrand

Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

Signature:

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Customer: ABC

## Helium Flow

Form # 3620 Rev. Q 4/21/2009

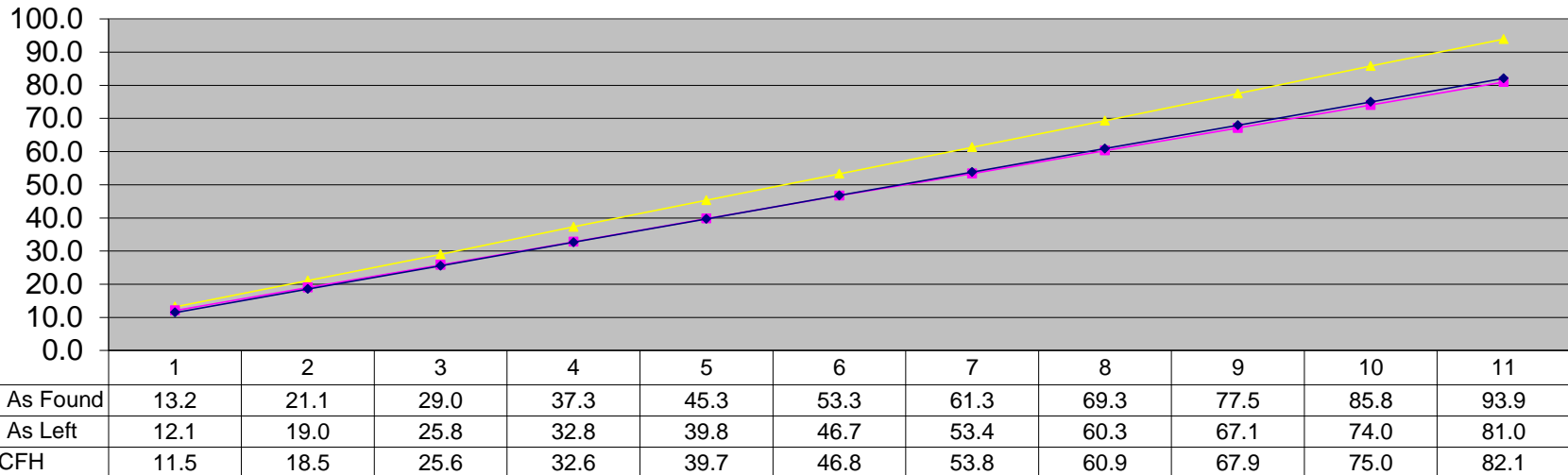
Cert. No: 2009-031

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Console:	Miller 3620	Serial Number:	KB26001B	Type of Gas:	Helium	Full Flow SCFH [FS]:	110.28
Device ID #:	M-146	Booth #:	Booth #1				
Device Under Test:	Critical Orifice Flows	Critical Orifice:	#80	Scale Rate:	Flow is in SCFH	Device ID #:	

Testing Instrument: Mass Flow Meter Alicat Scientific 0-400 scfh Serial Number: 44771

Secondary Gas Gauge Set Point	Critical Orifices SCFH Converted	As Found SCFH Actual	As Found SCFH Deviation	SCFH % Deviation	As Left SCFH	As Left SCFH Deviation	As Left SCFH % Deviation
20	11.5	13.2	1.7	1.6	12.1	0.6	0.6
40	18.5	21.1	2.6	2.3	19.0	0.5	0.4
60	25.6	29.0	3.4	3.1	25.8	0.2	0.2
80	32.6	37.3	4.7	4.2	32.8	0.2	0.1
100	39.7	45.3	5.6	5.1	39.8	0.1	0.1
120	46.8	53.3	6.5	5.9	46.7	-0.1	-0.1
140	53.8	61.3	7.5	6.8	53.4	-0.4	-0.4
160	60.9	69.3	8.4	7.6	60.3	-0.6	-0.5
180	67.9	77.5	9.6	8.7	67.1	-0.8	-0.8
200	75.0	85.8	10.8	9.8	74.0	-1.0	-0.9
220	82.1	93.9	11.8	10.7	81.0	-1.1	-1.0



Changed out the failed orifice.

Calibrated By: Allen Hildebrand

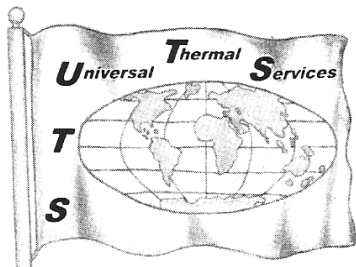
Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

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: ABC

## Argon Carrier Flow #1

Form # 3620 Rev. Q 4/21/2009

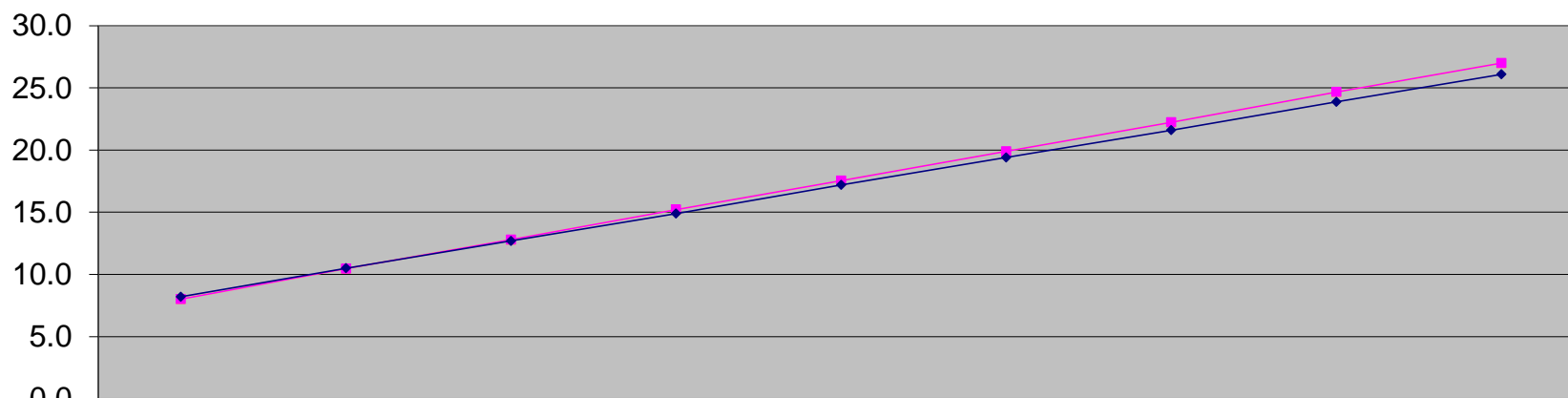
Cert. No: 2009-031

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Console:	Miller 3620	Serial Number:	KB26001B	Type of Gas:	Argon	Full Flow SCFH [FS]:	46.22
Device ID #:	M-146	Booth Number:	Booth #1				
Device Under Test:	Critical Orifice Flows	Critical Orifice:	#77	Scale Rate:	Flow is in SCFH	Device ID #:	

Testing Instrument: Mass Flow Meter Alicat Scientific 0-75 scfh Serial Number: 44770

Carrier Gas #1 Gauge Set Point	Critical Orifices SCFH Converted	As Found SCFH Actual	As Found SCFH Deviation	SCFH % Deviation	As Left SCFH	As Left SCFH Deviation	As Left SCFH % Deviation
20	8.2	8.0	-0.2	-0.4	8.0	-0.2	-0.4
30	10.5	10.5	0.0	-0.1	10.5	0.0	-0.1
40	12.7	12.8	0.1	0.2	12.8	0.1	0.2
50	14.9	15.2	0.3	0.7	15.2	0.3	0.7
60	17.2	17.5	0.3	0.7	17.5	0.3	0.7
70	19.4	19.9	0.5	1.1	19.9	0.5	1.1
80	21.6	22.2	0.6	1.4	22.2	0.6	1.4
90	23.9	24.7	0.8	1.7	24.7	0.8	1.7
100	26.1	27.0	0.9	1.9	27.0	0.9	1.9



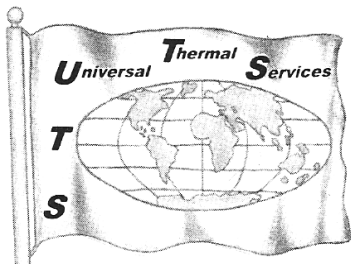
	1	2	3	4	5	6	7	8	9
Flow SCFH As Found	8.0	10.5	12.8	15.2	17.5	19.9	22.2	24.7	27.0
Flow SCFH As Left	8.0	10.5	12.8	15.2	17.5	19.9	22.2	24.7	27.0
Set Point SCFH	8.2	10.5	12.7	14.9	17.2	19.4	21.6	23.9	26.1

Calibrated By: Allen Hildebrand  
Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

Signature: *Allen R. Hildebrand*

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Service  
Training  
Calibration  
Certification  
Maintenance

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uts@wolfnet.net

Customer: ABC

## Argon Carrier Flow #2

Form # 3620 Rev. Q 4/21/2009

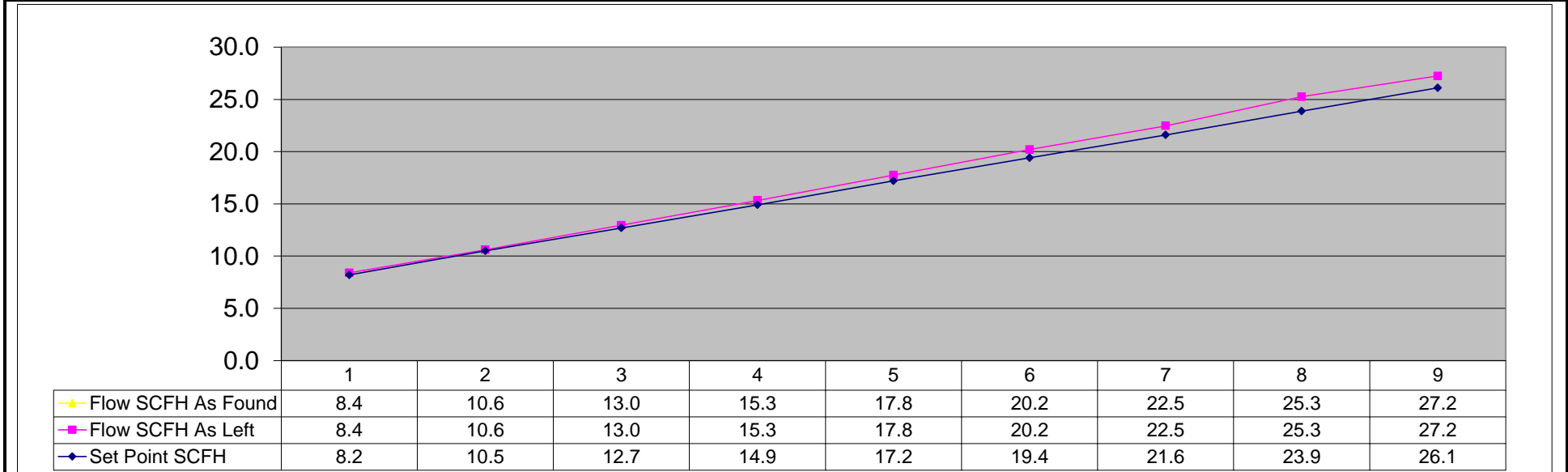
Cert. No: 2009-031

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Console:	Miller 3620	Serial Number:	KB26001B	Type of Gas:	Argon	Full Flow SCFH [FS]:	46.22
Device ID #:	M-146	Booth Number:	Booth #1				
Device Under Test:	Critical Orifice Flows	Critical Orifice:	#77	Scale Rate:	Flow is in SCFH	Device ID #:	

Testing Instrument: Mass Flow Meter Alicat Scientific 0-75 scfh Serial Number: 44770

Carrier Gas #2 Gauge Set Point	Critical Orifices SCFH Converted	As Found SCFH Actual	As Found SCFH Deviation	SCFH % Deviation	As Left SCFH	As Left SCFH Deviation	As Left SCFH % Deviation
20	8.2	8.4	0.2	0.4	8.4	0.2	0.4
30	10.5	10.6	0.1	0.2	10.6	0.1	0.2
40	12.7	13.0	0.3	0.5	13.0	0.3	0.5
50	14.9	15.3	0.4	0.9	15.3	0.4	0.9
60	17.2	17.8	0.6	1.2	17.8	0.6	1.2
70	19.4	20.2	0.8	1.7	20.2	0.8	1.7
80	21.6	22.5	0.9	1.9	22.5	0.9	1.9
90	23.9	25.3	1.4	3.0	25.3	1.4	3.0
100	26.1	27.2	1.1	2.5	27.2	1.1	2.5



Calibrated By: Allen Hildebrand

Calibrated Date: 4/20/2009

Next Calibration Due: 10/20/2009

Signature: *Allen R. Hildebrand*

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