

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

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

Metco Multi / Uni-Coat Certificate of Calibration

			Certi	ficate of Cal	ibration		Work Instruction:	WI-026 Rev.	A 22-Feb-10
Certificate Number:	2023-035							Pa	ge: 1 of 16
ustomer:	Universal Thermal	Console	Metco MultiCoat	9MP-CL #3 Feeder:	9MP-CL	9MP-DJ-CL #1Feeder:	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	9MP-CL #2 Feeder:	9MP-CL				
Name:	Allen Hildebrand	With in 3%:	No	Serial Number:	A9MPCL20071019-1				
Phone Number:	920-596-2983	Adjustments:	Yes	Device ID:	PTS 169				
			N.I.S.T. Ins	truments Used	for This Calib	oration			
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	Mass Flow Meter	Test Instrument: Med.	Mass Flow Meter	Test Instrument: High	Mass Flow Meter	Weight Set:	Set 1	3NGF	
Make:	Alicat 75 scfh	Make:	Alicat 400 scfh	Make:	Alicat 2150 scfh	Sizes:	1Kg, 3Kg, 4Kg, 5Kg, 5Kg	3NGF	
lodel:	PCU	Model:	PCU	Model:	PCU	Next Calibration Due:	31-Aug-24	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	
	Μ	lass Flow Con	trollers Inst	alled in this Me	etco Gas Modu	le and Feeders	5		
	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	
	Argon Primary Bronkhorst	Nitrogen Primary Bronkhorst	Hydrogen Bronkhorst		Carrier Ar/N2 MFC Parker	Carrier Ar/N2 MFC Parker	Pressure Regulator	Pressure Regulator	
/lake: Device ID:	Bronkhorst N/A	Bronkhorst N/A	Bronkhorst N/A		Parker N/A	Parker N/A	Pressure Regulator	Pressure Regulator	
Make: Device ID:	Bronkhorst	Bronkhorst	Bronkhorst		Parker N/A 3467240102001	Parker N/A 3722420001007	Pressure Regulator	Pressure Regulator	
/lake: Device ID: Serial Number:	Bronkhorst N/A	Bronkhorst N/A M8209268AA 100 In/min	Bronkhorst N/A		Parker N/A	Parker N/A	, , , , , , , , , , , , , , , , , , ,		
Make: Device ID: Serial Number:	Bronkhorst N/A M8211606D	Bronkhorst N/A M8209268AA	Bronkhorst N/A M9204381		Parker N/A 3467240102001	Parker N/A 3722420001007	, , , , , , , , , , , , , , , , , , ,		
/lake: Device ID: Serial Number: Flow Range: /lass Flow Controller:	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air	Bronkhorst N/A M8209268AA 100 In/min	Bronkhorst N/A M9204381 20 In/min		Parker N/A 3467240102001	Parker N/A 3722420001007	N/A	N/A	
Aake: Device ID: Serial Number: Flow Range: Aass Flow Controller: Aake:	Bronkhorst N/A M8211606D 100 In/min DJ HVOF	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF	Bronkhorst N/A M9204381 20 In/min DJ HVOF		Parker N/A 3467240102001	Parker N/A 3722420001007	N/A #3 Feeder HVOF	N/A #3 Feeder HVOF	
Vake: Device ID: Serial Number: Flow Range: Vass Flow Controller: Vake:	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A		Parker N/A 3467240102001	Parker N/A 3722420001007	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A	N/A #3 Feeder HVOF	
Mass Flow Controller: Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number:	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H	Bronkhorst N/A 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A		Parker N/A 3467240102001	Parker N/A 3722420001007	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B	N/A #3 Feeder HVOF	
Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number: Flow Range:	Bronkhorst N/A M8211606D 100 ln/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH		Parker N/A 3467240102001	Parker N/A 3722420001007	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A	N/A #3 Feeder HVOF Pressure Regulator	
Vake: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number:	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Parameter	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min	N/A #3 Feeder HVOF Pressure Regulator N/A	
Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number: Flow Range: Flasma System Perforr	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Paramete Plasma Settings	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH ers as Provided by	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min	N/A #3 Feeder HVOF Pressure Regulator N/A	
Aake: Device ID: Serial Number: Flow Range: Aass Flow Controller: Make: Device ID: Serial Number: Flow Range: Plasma System Perform Gas	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Paramete Plasma Settings Scfh Gas Flow	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min on Column of Each Sheet A cifications, or Better, For T	N/A #3 Feeder HVOF Pressure Regulator N/A fter This Sheet Is The he Individual Device	
Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number: Flow Range: Plasma System Perforr Gas Ar	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Paramete Plasma Settings Scfh Gas Flow 127	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH ers as Provided by Gun	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min on Column of Each Sheet A iffications, or Better, For T 0 - 2% Green is Acceptat	N/A #3 Feeder HVOF Pressure Regulator N/A fter This Sheet Is The he Individual Device	2
Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number: Flow Range: Plasma System Perform Gas Ar H2	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Paramete Plasma Settings Scfh Gas Flow 127 17	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH ers as Provided by Gun Amps	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min on Column of Each Sheet A cifications, or Better, For T 0 - 2% Green is Acceptal 2.1 - 3% Orange is Alert	N/A #3 Feeder HVOF Pressure Regulator N/A fter This Sheet Is The he Individual Device	
Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number: Flow Range: Plasma System Perforr Gas Ar H2 N2	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Paramete Plasma Settings Scfh Gas Flow 127 17 0	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH ers as Provided by Gun Gun 500	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min on Column of Each Sheet A iffications, or Better, For T 0 - 2% Green is Acceptat	N/A #3 Feeder HVOF Pressure Regulator N/A fter This Sheet Is The he Individual Device	
Make: Device ID: Serial Number: Flow Range: Mass Flow Controller: Make: Device ID: Serial Number: Flow Range: Plasma System Perform Gas Ar H2	Bronkhorst N/A M8211606D 100 In/min DJ HVOF Air Bronkhorst N/A M9206234D 800 SCFH mance w/Paramete Plasma Settings Scfh Gas Flow 127 17	Bronkhorst N/A M8209268AA 100 In/min DJ HVOF Oxygen Bronkhorst N/A M9204982H 400 SCFH ers as Provided by Gun Amps	Bronkhorst N/A M9204381 20 In/min DJ HVOF H2 Fuel Bronkhorst N/A M9206129A 800 SCFH	nitially	Parker N/A 3467240102001	Parker N/A 3722420001007 25/21.2 In/min	N/A #3 Feeder HVOF Carrier N2 Bronkhurst N/A M8209620B 20 In/min on Column of Each Sheet A cifications, or Better, For T 0 - 2% Green is Acceptal 2.1 - 3% Orange is Alert	N/A #3 Feeder HVOF Pressure Regulator N/A fter This Sheet Is The he Individual Device	

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 adjusttments. It only job is to make the powder fall at a smooth rate. Reference Only is sufficent for now until we find a solution to disconnect the feeder from the system.

					RIANI A
Calibrated By:	Allen Hildebrand			_	On R Hillehand
Calibrated Date:	5-Dec-23	Calibration Due:	5-Dec-24	Signature:	allen 1 - 1, ray and



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

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

Console:	Metco MultiCoat		Serial Number:	SM090545	Booth :	1		Page	
						•			
Festing Instrument:	Amp Clamp	i1010	Serial Number:		Testing Instrument:	Multi Meter	233	Serial Number:	MM-5
				Amp Meter					
Device Under Test: Device ID Number:	Digital Amp Meter		Amps Full Scale [FS]	2000					
Amps	Amp Meter	As Found	As Found	As Found	Tolerences	As Left	As Left	As Left	Tolerence
Set Point	Display Reading	NIST Meter	Amps Deviation	Amps % Deviation	Pass/Fail	NIST Meter	Amps Deviation	Amps % Deviation	Pass/Fa
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					900.0			
	1000	1009.0	9.0	0.5	Pass	1009.0	9.0	0.5	Pass
		1009.0		Volt Meter				0.5	Pass
Device Under Test: Device ID Number:	Digital Volt Meter Multi Meter	233	9.0 Volts Full Scale [FS Serial Number:	Volt Meter				0.5	Pass
Device Under Test: Device ID Number: Testing Instrument:	Digital Volt Meter Multi Meter	233	Volts Full Scale [FS Serial Number:	Volt Meter 200 MM-5	Pass	1009.0	9.0	· · ·	
evice Under Test: evice ID Number: esting Instrument: Volt Meter	Digital Volt Meter Multi Meter Volt Meter	233 As Found	Volts Full Scale [FS Serial Number: As Found	Volt Meter 200 MM-5 As Found	Pass Tolerences	1009.0 As Left	9.0 As Left	As Left	Tolerence
evice Under Test: evice ID Number: esting Instrument: Volt Meter Set Point	Digital Volt Meter Multi Meter Volt Meter Display Reading	233 As Found NIST Meter	Volts Full Scale [FS Serial Number: As Found Volts Deviation	Volt Meter 200 MM-5 As Found Volts % Deviation	Pass Tolerences Pass/Fail	1009.0 As Left NIST Meter	9.0 As Left Volts Deviation	As Left Volts % Deviation	Tolerence Pass/Fa
vevice Under Test: vevice ID Number: esting Instrument: Volt Meter Set Point 30.5	Digital Volt Meter Multi Meter Volt Meter Display Reading 30.5	233 As Found NIST Meter 31.0	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5	Volt Meter 200 MM-5 As Found Volts % Deviation 0.3	Pass Tolerences Pass/Fail Pass	As Left NIST Meter 31.0	9.0 As Left Volts Deviation 0.5	As Left Volts % Deviation 0.3	Tolerenc Pass/Fa Pass
Vevice Under Test: Vevice ID Number: esting Instrument: Volt Meter Set Point 30.5 37.6	Digital Volt Meter Multi Meter Volt Meter Display Reading 30.5 37.6	233 As Found NIST Meter 31.0 38.0	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4	Volt Meter 200 MM-5 As Found Volts % Deviation 0.3 0.2	Pass Tolerences Pass/Fail Pass Pass	1009.0 As Left NIST Meter 31.0 38.0	9.0 As Left Volts Deviation 0.5 0.4	As Left Volts % Deviation 0.3 0.2	Tolerenc Pass/Fa Pass Pass
Device Under Test: Device ID Number: Sesting Instrument: Volt Meter Set Point 30.5 37.6 42.3	Digital Volt Meter Multi Meter Volt Meter Display Reading 30.5 37.6 42.3	233 As Found NIST Meter 31.0 38.0 43.5	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2	Solution Solution	Pass Tolerences Pass/Fail Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5	9.0 As Left Volts Deviation 0.5 0.4 1.2	As Left Volts % Deviation 0.3 0.2 0.6	Tolerenc Pass/Fa Pass Pass Pass Pass
Device Under Test: Device ID Number: Testing Instrument: Volt Meter Set Point 30.5 37.6 42.3 50.7	Digital Volt Meter Multi Meter Display Reading 30.5 37.6 42.3 50.7	233 As Found NIST Meter 31.0 38.0 43.5 50.7	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0	Signature Signature 31 200 MM-5 MM-5 As Found 0.3 0.3 0.2 0.6 0.0	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0	As Left Volts % Deviation 0.3 0.2 0.6 0.0	Tolerenc Pass/Fa Pass Pass Pass Pass Pass
Device Under Test: Device ID Number: esting Instrument: Volt Meter Set Point 30.5 37.6 42.3 50.7 57.8	Digital Volt Meter Multi Meter Display Reading 30.5 37.6 42.3 50.7 57.8	233 As Found NIST Meter 31.0 38.0 43.5 50.7 58.4	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0 0.6	Signal Signal<	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7 58.4	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0 0.6	As Left Volts % Deviation 0.3 0.2 0.6 0.0 0.3	Tolerenc Pass/Fa Pass Pass Pass Pass Pass Pass
evice Under Test: evice ID Number: esting Instrument: Volt Meter Set Point 30.5 37.6 42.3 50.7	Digital Volt Meter Multi Meter Display Reading 30.5 37.6 42.3 50.7	233 As Found NIST Meter 31.0 38.0 43.5 50.7	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0	Signature Signature 31 200 MM-5 MM-5 As Found 0.3 0.3 0.2 0.6 0.0	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0	As Left Volts % Deviation 0.3 0.2 0.6 0.0	Tolerenc Pass/Fa Pass Pass Pass Pass Pass
evice Under Test: evice ID Number: esting Instrument: Volt Meter Set Point 30.5 37.6 42.3 50.7 57.8 61.4	Volt Meter Volt Meter Display Reading 30.5 37.6 42.3 50.7 57.8 61.4	233 As Found NIST Meter 31.0 38.0 43.5 50.7 58.4 61.9	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0 0.6	Signal Signal<	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7 58.4	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0 0.6	As Left Volts % Deviation 0.3 0.2 0.6 0.0 0.3	Tolerenc Pass/Fa Pass Pass Pass Pass Pass Pass
Vevice Under Test: Vevice ID Number: Volt Meter Set Point 30.5 37.6 42.3 50.7 57.8 61.4	Volt Meter Volt Meter Display Reading 30.5 37.6 42.3 50.7 57.8 61.4	233 As Found NIST Meter 31.0 38.0 43.5 50.7 58.4 61.9	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0 0.6	Signal Signal<	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7 58.4	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0 0.6	As Left Volts % Deviation 0.3 0.2 0.6 0.0 0.3	Tolerence Pass/Fa Pass Pass Pass Pass Pass Pass
Vevice Under Test: Vevice ID Number: Volt Meter Set Point 30.5 37.6 42.3 50.7 57.8 61.4 System Performanc Gas Ar	Digital Volt Meter Multi Meter Display Reading 30.5 37.6 42.3 50.7 57.8 61.4 ce w/Parameters at Gas Flow 127	233 As Found NIST Meter 31.0 38.0 43.5 50.7 58.4 61.9 fter Calibration Volts	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0 0.6	Signal Signal<	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7 58.4	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0 0.6	As Left Volts % Deviation 0.3 0.2 0.6 0.0 0.3	Tolerence Pass/Fa Pass Pass Pass Pass Pass Pass
Vevice Under Test: Vevice ID Number: esting Instrument: Volt Meter Set Point 30.5 37.6 42.3 50.7 57.8 61.4 System Performanc Gas	Digital Volt Meter Multi Meter Display Reading 30.5 37.6 42.3 50.7 57.8 61.4 Ce w/Parameters at Gas Flow	233 As Found NIST Meter 31.0 38.0 43.5 50.7 58.4 61.9 fter Calibration	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0 0.6	Signal Signal<	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7 58.4	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0 0.6	As Left Volts % Deviation 0.3 0.2 0.6 0.0 0.3	Tolerenc Pass/Fa Pass Pass Pass Pass Pass Pass
Device Under Test: Device ID Number: Testing Instrument: Volt Meter Set Point 30.5 37.6 42.3 50.7 57.8 61.4 System Performanc Gas Ar	Digital Volt Meter Multi Meter Display Reading 30.5 37.6 42.3 50.7 57.8 61.4 ce w/Parameters at Gas Flow 127	233 As Found NIST Meter 31.0 38.0 43.5 50.7 58.4 61.9 fter Calibration Volts	Volts Full Scale [FS Serial Number: As Found Volts Deviation 0.5 0.4 1.2 0.0 0.6	Signal Signal<	Pass Tolerences Pass/Fail Pass Pass Pass Pass Pass Pass Pass	1009.0 As Left NIST Meter 31.0 38.0 43.5 50.7 58.4	9.0 As Left Volts Deviation 0.5 0.4 1.2 0.0 0.6	As Left Volts % Deviation 0.3 0.2 0.6 0.0 0.3	Tolerence Pass/Fai Pass Pass Pass Pass Pass Pass



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Customer:

Universal Therma

Primary Argon Flow-Plasma

	N/A Ar Mass Flow Contr.	Serial Number: Booth: Serial Number:	M8211606D 1 M8211606D	Type of Gas: Flow Range:	Argon 100 In/min	Scale Rate:	Flow is in SCFH	Ful	I Flow SCFH [FS]:	228
sting 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	Tolerences Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerenc Pass/Fa
30.1	30		30.1	0.1	0.0	Pass	30.1 60.8	0.1	0.0	Pass
60.1 90.0	60 90		60.8 90.5	0.8	0.4 0.2	Pass Pass	90.5	0.8	0.4	Pass Pass
120.1	120		119.8	-0.2	-0.1	Pass	119.8	-0.2	-0.1	Pass
150.1	150		149.4	-0.2	-0.3	Pass	149.4	-0.2	-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
	200.0									
	150.0	1	2	3			5	6	7	
Flow SCFF	150.0 100.0 50.0 0.0	1 30.1	2 60.8	3 90.5	4		5	<u>6</u> 179.5	7 211	2
Flow SCFH	150.0 100.0 50.0 0.0	1 30.1 30.1	2 60.8 60.8	3 90.5 90.5	4 119.8 119.8		5 149.4 149.4	6 179.5 179.5	7 211. 211.	



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Customer:

Calibrated By:

Calibrated Date:

Universal Therm

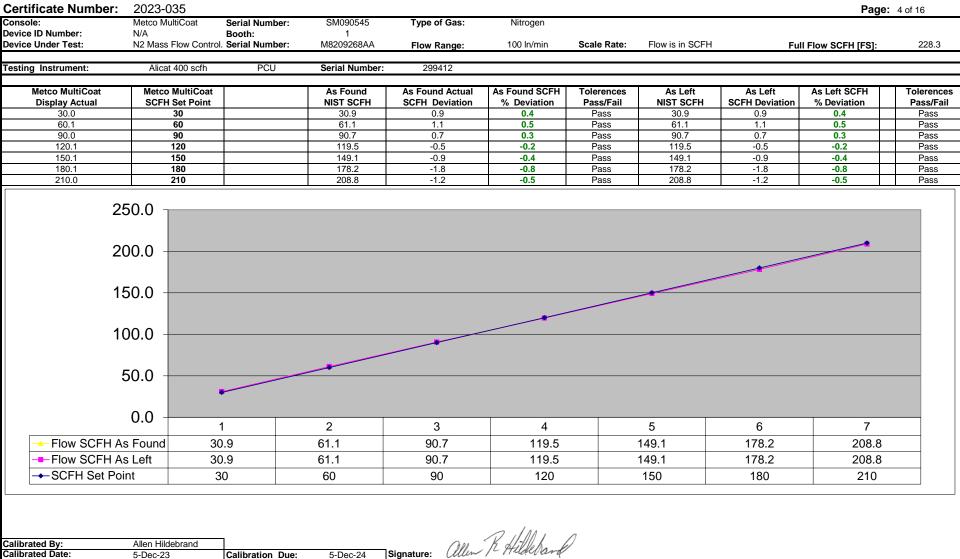
Allen Hildebrand

Calibration Due:

5-Dec-23

Primary Nitrogen Flow-Plasma

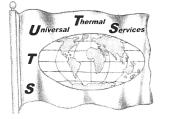
Form Number: F-315-026 Rev. L 16-Oct-18



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

5-Dec-24

Signature:



Customer:

Universal Therm

Secondary H2 Flow-Plasma

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

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

nsole: vice ID Number:	Metco MultiCoat	Serial Number: Booth:	SM090545 1	Type of Gas:	Hydrogen					
vice ID Number: vice Under Test:	N/A H2 Mass Flow Contr.		M9204381	Flow Range:	20 In/min	Scale Rate:	Flow is in SCFH	Ful	I Flow SCFH [FS]:	45.7
sting 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 Deviation	As Found SCFH % Deviation	Tolerences Pass/Fail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerenc Pass/Fa
5.0	5		5.5	0.5	1.0	Pass	5.5	0.5	1.0	Pass
10.0	10		10.4	0.4	0.9	Pass	10.4	0.4	0.9	Pass
15.0	15		15.2	0.2	0.4	Pass	15.2	0.2	0.4	Pass
20.0	20		20.1	0.1	0.2	Pass	20.1	0.1	0.2	Pass
25.0 30.0	25 30		25.0 30.0	0.0	0.0	Pass Pass	25.0 30.0	0.0 0.0	0.0	Pass Pass
35.0	30		30.0	0.0	0.0	Pass	30.0	0.0	0.0	Pass
40.0	40		40.3	0.3	0.7	Pass	40.3	0.3	0.7	Pass
45.0	45		45.6	0.6	1.3	Pass	45.6	0.6	1.3	Pass
2	30.0 25.0 20.0 15.0 10.0 5.0									
	0.0	2	3	4	5	6	7	8	9	
	•	10.4	15.2	20.1	25.0	30.0	35.1	40.3	45.6	
				-						
-Flow SCFH As	t 5.5									
		10.4	15.2 15	20.1	25.0 25	30.0 30	35.1 35	40.3	45.6 45	



Customer:

Device ID Number:

Device Under Test:

Testing Instrument:

Console:

Certificate Number:

Metco MultiCoat

Display Actual 400.0 450.0 500.0 551.0 600.0 650.0 700.0 750.0

Universal Therm

2023-035

800.0 700.0 600.0 500.0 400.0 300.0 200.0 100.0

0.0

Flow SCFH As Found

Flow SCFH As Left

1

390.6

403.7

Air/N2 Flow-DJ HVOF

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

Page: 6 of 16

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

7

675.0

700.0

6

627.4

650.0

8

721.7

749.7

750

Metco MultiCoat N/A	Serial Number: Booth:	SM090545 1	Type of Gas:	Air					
Air Mass Flow Contr.	Serial Number:	M9206234D	Flow Range:	800 SCFH	Scale Rate:	Flow is in SCFH	Ful	I Flow SCFH [FS]:	
Alicat 2150 scfh	PCU	Serial Number	: 299413						
						Adjusted			
Metco MultiCoat		As Found	As Found Actual	As Found SCFH	Tolerences	As Left	As Left	As Left SCFH	Tolerences
SCFH Set Point		NIST SCFH	SCFH Deviation	% Deviation	Pass/Fail	NIST SCFH	SCFH Deviation	% Deviation	Pass/Fail
400		390.6	-9.4	-1.2	Pass	403.7	3.7	0.5	Pass
450		438.3	-11.7	-1.5	Pass	453.2	3.2	0.4	Pass
500		485.4	-14.6	-1.8	Pass	502.4	2.4	0.3	Pass
550		533.4	-16.6	-2.1	Alert	552.2	2.2	0.3	Pass
600		581.0	-19.0	-2.4	Alert	601.1	1.1	0.1	Pass
650		627.4	-22.6	-2.8	Alert	650.0	0.0	0.0	Pass
700		675.0	-25.0	-3.1	Fail	700.0	0.0	0.0	Pass
750		721.7	-28.3	-3.5	Fail	749.7	-0.3	0.0	Pass
300.0 700.0 500.0 500.0									
100.0		•							

5

581.0

601.1

 Set Point SCFH 400 550 600 700 450 500 650 allen R Hildehn... Calibrated By: Allen Hildebrand Calibrated Date: 5-Dec-23 Calibration Due: 5-Dec-24 Signature:

3

485.4

502.4

4

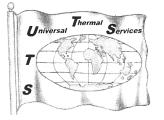
533.4

552.2

2

438.3

453.2



Customer:

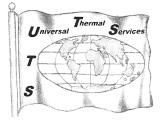
Universal Therm

Oxygen Flow-DJ HVOF

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

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

N/A	Serial Number: Booth:	SM090545 1	Type of Gas:	Oxygen					
O2 Mass Flow Cont.		M9204982H	Flow Range:	400 SCFH	Scale Rate:	Flow is in SCFH	Ful	II Flow SCFH [FS]:	
Alicat 2150 scfh	PCU	Serial Number:	299413						
Metco MultiCoat		As Found	As Found Actual	As Found SCEH	Tolerences	As Left	∆s l eft	As Left SCFH	Tolerend
									Pass/Fa
50		47.9	-2.1	-0.5	Pass	47.9	-2.1	-0.5	Pass
100		100.6	0.6	0.1	Pass	100.6	0.6	0.1	Pass
					Pass				Pass
									Pass
									Pass
									Pass Pass
									Pass
250.0									
150.0		+							
100.0 50.0									
100.0		2	3	4	5	6	7	3	3
100.0 50.0		2 00.6	3 150.2	4 203.4	5 253.3	6 303.0	7 352.5		-
100.0 50.0 0.0	7.9 10 7.9 10					-	-	5 402 5 402	2.0
	Metco MultiCoat SCFH Set Point 50 100 150 200 250 300 400 400 450.0 350.0 350.0 300.0 250.0 400	Metco MultiCoat SCFH Set Point 50 100 150 200 250 300 350 400	Metco MultiCoat SCFH Set Point As Found NIST SCFH 50 47.9 100 100.6 150 150.2 200 203.4 250 253.3 300 303.0 350 352.5 400 402.0	Metco MultiCoat SCFH Set Point As Found NIST SCFH As Found Actual SCFH Deviation 50 47.9 -2.1 100 100.6 0.6 150 150.2 0.2 200 203.4 3.4 250 253.3 3.3 300 303.0 3.0 350 352.5 2.5 400 402.0 2.0	Metco MultiCoat SCFH Set Point As Found NIST SCFH As Found Actual SCFH Deviation As Found SCFH % Deviation 50 47.9 -2.1 -0.5 100 100.6 0.6 0.1 150 150.2 0.2 0.0 200 203.4 3.4 0.9 250 253.3 3.3 0.8 300 303.0 3.0 0.8 350 352.5 2.5 0.6 400 402.0 2.0 0.5	Metco MultiCoat SCFH Set Point As Found NIST SCFH As Found Actual SCFH Deviation As Found SCFH % Deviation Tolerences Pass/Fail 50 47.9 -2.1 -0.5 Pass 100 100.6 0.6 0.1 Pass 200 203.4 3.4 0.9 Pass 250 253.3 3.3 0.8 Pass 300 303.0 3.0 0.8 Pass 350 352.5 2.5 0.6 Pass 400 402.0 2.0 0.5 Pass 250.0 252.5 2.5 0.6 Pass 350 352.5 2.5 0.6 Pass 400 402.0 2.0 0.5 Pass 450.0 250.0 250.0 2.0 0.5 2.5	Metco MultiCoat SCFH Set Point As Found NIST SCFH As Found Actual SCFH Deviation As Found SCFH % Deviation Tolerences Pass/Fail As Left NIST SCFH 50 47.9 -2.1 -0.5 Pass 47.9 100 100.6 0.6 0.1 Pass 10.6 150 150.2 0.2 0.0 Pass 150.2 200 203.4 3.4 0.9 Pass 253.3 300 253.3 3.3 0.8 Pass 253.3 300 303.0 3.0 0.8 Pass 303.0 350 352.5 2.5 0.6 Pass 352.5 400 402.0 2.0 0.5 Pass 402.0 450.0 400.0 2.0 0.5 Pass 402.0	Metco MultiCoat SCFH Set Point As Found NIST SCFH As Found Actual SCFH Deviation As Found SCFH Websiation Tolerences Pass/Fail As Left NIST SCFH As Left SCFH Deviation 50 47.9 -2.1 -0.5 Pass 47.9 -2.1 100 100.6 0.6 0.1 Pass 100.6 0.6 150 150.2 0.2 0.0 Pass 100.6 0.6 200 203.4 3.4 0.9 Pass 203.4 3.4 250 253.3 3.3 0.8 Pass 203.4 3.4 300 303.0 3.0 0.8 Pass 303.0 3.0 350 352.5 2.5 0.6 Pass 362.5 2.5 400 402.0 2.0 0.5 Pass 402.0 2.0 450.0 400.0 402.0 2.0 0.5 Pass 402.0 2.0	Metco MultiCoat SCFH Set Point As Found NIST SCFH As Found Actual SCFH Deviation As Found SCFH % Deviation Tolerences Pass/Fail As Left NIST SCFH As Left SCFH % Deviation 50 47.9 -2.1 -0.5 Pass 47.9 -2.1 -0.5 100 100.6 0.6 0.1 Pass 100.6 0.6 0.1 200 203.4 3.4 0.9 Pass 253.3 3.3 0.8 Pass 253.3 3.3 0.8 Pass 33.0 0.8 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5



Serial Number:

SM090545

Type of Gas:

Customer:

Console:

Calibrated By: Calibrated Date:

Certificate Number:

Universal Therm

2023-035

Calibration Due:

DJC

Hydrogen Flow-DJ HVOF

Hydrogen

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

F-315-026 Rev. L 16-Oct-18

Page: 8 of 16

ate:	Flow is in SCFH	Fu	II Flow SCFH [FS]:	
ces ail	As Left NIST SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolerences Pass/Fail

Form Number:

Device ID Number: N/A		Booth:	1							
evice Under Test: H2 M	lass Flow Contr.	Serial Number:	M9206129A	Flow Range:	800 SCFH	Scale Rate:	Flow is in SCFH	Ful	II Flow SCFH [FS]:	
sting Instrument:	licat 2150 scfh	PCU	Serial Number	: 299413						
	etco MultiCoat		As Found	As Found Actual	As Found SCFH	Tolerences	As Left	As Left	As Left SCFH	Tolerence
Display Actual S 100.0	CFH Set Point 100		NIST SCFH 103.9	SCFH Deviation 3.9	% Deviation 0.5	Pass/Fail Pass	NIST SCFH 103.9	SCFH Deviation 3.9	% Deviation 0.5	Pass/Fail Pass
200.0	200		205.8	5.8	0.5	Pass	205.8	5.8	0.7	Pass
301.0	300		307.1	7.1	0.9	Pass	307.1	7.1	0.9	Pass
401.0	400		406.3	6.3	0.8	Pass	406.3	6.3	0.8	Pass
500.0	500		504.3	4.3	0.5	Pass	504.3	4.3	0.5	Pass
600.0 702.0	<u>600</u> 700		603.1 702.4	3.1 2.4	0.4	Pass Pass	603.1 702.4	3.1 2.4	0.4	Pass Pass
801.0	800		801.0	1.0	0.3	Pass	801.0	1.0	0.3	Pass
800.0 700.0 600.0 500.0	о ——— с									
700.0 600.0										
700.0 600.0 500.0 400.0 300.0 200.0			2	3	4	5	6	7		
700.0 600.0 500.0 400.0 300.0 200.0 100.0			2 05.8	3 307.1	4 406.3	5 504.3	6 603.1	7 702.4	-	
700.0 600.0 500.0 400.0 300.0 200.0 100.0	D	.9 2		-		-	-		4 801	.0

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

Signature:

5-Dec-24



Universal Thermal

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

Customer:

Vibrator Air Pressure-Plasma

				#3 9N	IP-CL		Form Number:	F-315-026 Rev.	L 16-Oct-18
Certifiate Number: :	2023-035							P	age 9 of 16
Powder Feeder #3	9MP-CL		Serial Number:	A9MPCL20050901-1					0
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 Num	ber: PM-22
Pressure Full Scale = 60 PSI									
Pressure (PSI)	As Set	As Found	As Found	As Found	Tolerences	As Left	As Left	As Left	Tolerence
Set Point	Gauge Setting	NIST Pressure	PSI Deviation	PSI % of Deviation	Pass/Fail	NIST Pressure	PSI Deviation	PSI % Deviation	Pass/Fai
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
Sizes: Next Calibration Due:	1Kg, 3Kg, 4Kg, 5Kg, 5Kg 31-Aug-24	3NGF 3NGF 3NGF 3NGF 3NGF							
Hopper Weight Test in Kg	NIST Hopper Kg Weight	Hopper Kg Weight	Hopper Kg Weight	NIST Hopper Kg Weight	Hopper Kg Weight	Hopper Kg Weight			
Weight Kilo Gram	As Found	Deviation As Found	% of Deviation	As Left	Deviation As Found	% 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	Hopper Pressure	Hopper Pressure	Hopper Pressure						
Command	Displayed As Found	NIST Manometer	NIST As Left [2nd]						
Low: 42	42 334	40.5	40.5						

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



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

			0	#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	
esting Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411						
SCFH	SCFH Indicated	r	As Found	As Found Actual	As Found SCFH	Tolerance	Adjusted As Left	As Left	As Left SCFH %	Tolerand
Set Point	On Display		Actual SCFH	SCFH Deviation	% Deviation	Pass / Fail	AS Left Actual SCFH	AS Left SCFH Deviation	Deviation	Pass / Fa
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
	20.0 15.0 10.0 5.0									
	0.0	1	2		3		4		5	
			10.7		15.7		20.7		25.7	
Flow SCFH A	s Found	5.7	10.7							
Flow SCFH A Flow SCFH A		5.7 4.9	10.7		15.0		20.0		25.0	

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



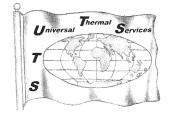
Universal Thermal Services Allen R. Hildebrand (President) E7064 Knopp Road Manawa, Wisconsin 54949 Phone – Fax 920-596-2983 uts@ wolfnet.net

Customer:

Universal Therma

Nitrogen Carrier Gas Flow-Plasma

			•	#3 9 M I	P-CL		Form Number:	F-315-026 Rev.	L	16-Oct-18
Certificate Number: Powder Feeder: Device ID Number: Device Under Test:	2023-035 9MP-CL PTS 166 Porter Mass Flow Cntr.	Serial Number: Booth Number: Device S/N:	A9MPCL20050901-1 1 3467240102001	Scale Rate:	Flow is in SCFH	Full Scale [FS]:	21.2 Scfh	Type of Gas:	Page: Nitrogen	11 of 16
esting 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	Tolerence Pass/Fail	As Left Actual SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Toleranc Pass / Fa
5	5		5.0	0.0	-0.2	Pass	5.0	0.0	-0.2	Pass
<u>10</u> 15	10 15		10.0 15.0	0.0 0.0	0.0	Pass Pass	10.0 15.0	0.0 0.0	0.0	Pass Pass
20	20		19.9	-0.1	-0.4	Pass	19.9	-0.1	-0.4	Pass
15 10 5		•								
0	.0									
	eft									
-Flow SCFH As Le				10		4 -				
0		1 5.0 5.0 5		2 10.0 10.0 10		3 15.0 15.0 15.0			4 19.9 19.9 20	



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

16-Oct-18

PM-22

Tolerences Pass/Fail

> Pass Pass Pass Pass Pass

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Customer: Universal Thermal

Vibrator Air Pressure-Plasma

oustomer.	Universal merma		VIL.		c33uic-i i	isina				
				#2 9N	IP-CL		Form Number:	F-315-026 Rev.	Ŀ	•
Certifiate Number: :	2023-035								Page	1
Powder Feeder #2:	9MP-CL		Serial Number:	A9MPCL20071019-1						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 N	Number:	
Pressure Full Scale = 60 PSI										-
Pressure (PSI)	As Set	As Found	As Found	As Found	Tolerences	As Left	As Left	As Left		-
Set Point	Gauge Setting	NIST Pressure	PSI Deviation	PSI % of Deviation	Pass/Fail	NIST Pressure	PSI Deviation	PSI % Deviation		
10	9.9	10.1	0.1	0.2	Pass	10.1	0.2	0.3		Ì
20	20.1	20.3	0.3	0.5	Pass	20.3	0.2	0.3		
30	29.9	30.4	0.4	0.7	Pass	30.4	0.5	0.8		
40	39.4	40.4	0.4	0.7	Pass	40.4	1.0	1.7		
50	50.0	50.9	0.9	1.5	Pass	50.9	0.9	1.5		
				1						
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	NIST Hopper Kg Weight	Hopper Kg Weight	Hopper Kg Weight	NIST Hopper Kg Weight	Hopper Kg Weight	Hopper Kg Weight				
Weight Kilo Gram	As Found	Deviation As Found	% of Deviation	As Left	Deviation As Found	% 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	Hopper Pressure	Hopper Pressure	Hopper Pressure							
Command	Displayed As Found	NIST Manometer	NIST As Left [2nd]							
Low: 42	34	42	42							
High: 334	334	334	334							

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



	Serial Number Booth Number e S/N: N/A	#2 9MP			Form Number:	F-315-026 Rev.	L Page:	16-Oct-18 13 of 16
L 59 Mass Flow Cntr. Devic	Booth Number	: 1					i age.	13 01 10
69 Mass Flow Cntr. Devic	Booth Number	: 1						
Mass Flow Cntr. Devic								
			Flow is in SCFH	Flow Range:	0-29.7 SCFH	Type of Gas:	Argon	
licat 75 scfh PCU	Serial Number:	299411						
					Adjusted			
	As Found			Tolerance	As Left	As Left		Toleran
								Pass / F Pass
								Pass
					9.0	-0.2		Pass
								Pass
						-0.5		Pass
1	2		3		4		5	
nd 5.7	10.7	,	15.6		20.7		25.7	
4.8	9.8		14.7		19.7		24.5	
5	10		15		20		25	
	1 nd 5.7 4.8	On Display Actual SCFH 5 5.7 10 10.7 15 15.6 20 20.7 25 25.7	On Display Actual SCFH SCFH Deviation 5 5.7 0.7 10 10.7 0.7 15 15.6 0.6 20 20.7 0.7 25 25.7 0.7	Actual SCFH SCFH Deviation % Deviation 5 5.7 0.7 2.3 10 10.7 0.7 2.3 15 15.6 0.6 1.9 20 20.7 0.7 2.3 25 25.7 0.7 2.3 16 15.6 0.6 1.9 20 20.7 0.7 2.3 25 25.7 0.7 2.3 16 1.9 2.3 3 17 2.3 2.3 3 18 3 3 3 1 2 3 3 1 2 3 3 1 2 3 3 1 2 3 3 10 5.7 10.7 15.6 4.8 9.8 14.7	On Display Actual SCFH SCFH Deviation % Deviation Pass / Fail 5 5.7 0.7 2.3 Alert 10 10.7 0.7 2.3 Alert 15 15.6 0.6 1.9 Pass / Fail 20 20.7 0.7 2.3 Alert 25 25.7 0.7 2.3 Alert 25 25.7 0.7 2.3 Alert 25 25.7 0.7 2.3 Alert 26 25.7 0.7 2.3 Alert 10 10.7 1.3 Alert 10 2 3 Alert 11 2 3 Alert 10 5.7 10.7 15.6 Alert 4.8	As Found On Display As Found Actual SCFH As Found Actual SCFH Deviation As Found SCFH Pass / Fail Tolerance Actual SCFH Actual SCFH As Left Actual SCFH 5 5.7 0.7 2.3 Alert 4.8 10 10.7 0.7 2.3 Alert 9.8 15 15.6 0.6 1.9 Pass 14.7 20 20.7 0.7 2.3 Alert 19.7 25 25.7 0.7 2.3 Alert 24.5 10 20.7 0.7 2.3 Alert 24.5 25 25.7 0.7 2.3 Alert 24.5 1 2 3 4 24.5 1 2 3 4 1 2 3 4 10 2.7 10.7 15.6 20.7 4.8 9.8 14.7 19.7	FH Indicated On Display As Found Actual SCFH As Found Actual SCFH Deviation As Found SCFH Pass / Fail As Left Actual SCFH As Left SCFH Deviation 5 5.7 0.7 2.3 Alert 4.8 -0.2 10 10.7 0.7 2.3 Alert 9.8 -0.2 15 115.6 0.6 1.9 Pass 14.7 -0.3 20 20.7 0.7 2.3 Alert 19.7 -0.4 25 25.7 0.7 2.3 Alert 24.5 -0.5 10 10.7 0.7 2.3 Alert 19.7 -0.4 25 25.7 0.7 2.3 Alert 24.5 -0.5 1 2 3 4 24.5 -0.5 1 2 3 4 4 1 2 3 4 4 10 5.7 10.7 15.6 20.7 4.8 9.8 14.7 19.7	IFH indicated On Display As Found Actual SCFH As Found Actual SCFH Deviation As Found actual % Deviation As Left Pass / Fail As Left Actual SCFH ScFH Deviation As Left Deviation As Left SCFH Deviation As Left Deviation As Left SCFH Deviation As Left Deviation As Left Actual SCFH % As Left Deviation As Left Actual SCFH ScFH % As Left Deviation As Left Actual SCFH % As Left Deviation As Left Actual SCFH % As Left Deviation As Left Actual SCFH % As Left Deviation As Left Deviation As Left Actual SCFH % As Left Deviation As Left

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



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 9M	P-CL		Form Number:	F-315-026 Rev.	L	16-Oct-18
ertificate Number:	2023-035								Page:	14 of 16
vice ID Number:	9MP-CL PTS 169 Porter Mass Flow Cntr.	Device S/N:	Serial Number Booth Number N/A	r: A9MPCL20071019-1 r: 1 Scale Rate:	1 Flow is in SCFH	Full Scale [FS]:	21.2 Scfh	Type of Gas:	Nitrogen	
sting Instrument:	Alicat 75 scfh	PCU S	erial Number:	299411						
		100					Adjusted			
SCFH Set Point	SCFH Indicated On Display		As Found Actual SCFH	As Found Actual SCFH Deviation	As Found SCFH % Deviation	Tolerence Pass/Fail	As Left Actual SCFH	As Left SCFH Deviation	As Left SCFH % Deviation	Tolera Pass /
5	5		4.8	-0.2	-1.1	Pass	5.1	0.1	0.6	Pass
10 15	10 15		9.8 14.7	-0.2 -0.3	-0.9 -1.6	Pass Pass	10.0 14.9	0.0 -0.1	-0.1 -0.4	Pas Pas
20	20		14.7	-0.3	-1.6	Alert	20.0	0.0	0.4	Pas
25. 20. 15. 10.	0									
5. 0.		1		2		3			4	
	und	4.8		9.8		14.7			19.5	
- Flow SCFH As Let		5.1		10.0		14.9			20.0	
-Set Point SCFH		5		10		15			20	
					un R Hildeban				20	
alibrated By:	Allen Hildebrand 5-Dec-23 Ca	alibration Due:	5-Dec-24	Signature:	In 12 Hildebar	K				



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

L 16-Oct-18

F-315-026 Rev.

Form Number:



Universal Thermal

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

87-V As Found NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	Serial Number: Booth Number: Device S/N: Serial Number: As Found PSI Deviation 0.7 1.4 1.9 2.8 3.4	: N/A MM-7 As Found PSI % of Deviation 1.2 2.3 3.2 4.7 5.7		Press. Transducer As Left NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi g down to where the pick		Serial Num As Left PSI % Deviation 1.2 2.3 3.2 4.7 5.7	her: PM-22 Tolerence Pass/Fail Reference Or Reference Or Reference Or Reference Or Reference Or
As Found NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	Booth Number: Device S/N: Serial Number: As Found PSI Deviation 0.7 1.4 1.9 2.8	: 1 N/A MM-7 As Found PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Tolerences Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	As Left NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	As Left PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	As Left PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Tolerence Pass/Fai Reference O Reference O Reference O
As Found NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	Device S/N: Serial Number: As Found PSI Deviation 0.7 1.4 1.9 2.8	: N/A MM-7 As Found PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Tolerences Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	As Left NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	As Left PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	As Left PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Tolerenc Pass/Fa Reference C Reference C Reference C
As Found NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	Serial Number: As Found PSI Deviation 0.7 1.4 1.9 2.8	MM-7 As Found PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Tolerences Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	As Left NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	As Left PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	As Left PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Tolerenc Pass/Fa Reference C Reference C Reference C
As Found NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	As Found PSI Deviation 0.7 1.4 1.9 2.8	As Found PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Tolerences Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	As Left NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	As Left PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	As Left PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Tolerence Pass/Fai Reference O Reference O Reference O
As Found NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	As Found PSI Deviation 0.7 1.4 1.9 2.8	As Found PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Tolerences Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	As Left NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	As Left PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	As Left PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Tolerence Pass/Fai Reference O Reference O Reference O
NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 4000000000000000000000000000000000000	PSI Deviation 0.7 1.4 1.9 2.8	PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fai Reference O Reference O Reference O Reference O
NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 4000000000000000000000000000000000000	PSI Deviation 0.7 1.4 1.9 2.8	PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fa Reference C Reference C Reference C Reference C
NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 4000000000000000000000000000000000000	PSI Deviation 0.7 1.4 1.9 2.8	PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fai Reference O Reference O Reference O Reference O
NIST Pressure 10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 4000000000000000000000000000000000000	PSI Deviation 0.7 1.4 1.9 2.8	PSI % of Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fail Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	NIST Pressure 10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	PSI Deviation 0.7 1.4 1.9 2.8 3.4 Coat	PSI % Deviation 1.2 2.3 3.2 4.7 5.7	Pass/Fai Reference O Reference O Reference O Reference O
10.7 21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF 40pper Kg Weight	0.7 1.4 1.9 2.8	1.2 2.3 3.2 4.7 5.7	Reference Only Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	10.7 21.4 31.9 42.8 53.4 ent Interface to Metco Multi	0.7 1.4 1.9 2.8 3.4 Coat	1.2 2.3 3.2 4.7 5.7	Reference O Reference O Reference O Reference O
21.4 31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF Bopper Kg Weight	1.4 1.9 2.8	2.3 3.2 4.7 5.7	Reference Only Reference Only Reference Only Reference Only Not adjustable with Curr	21.4 31.9 42.8 53.4 ent Interface to Metco Multi	1.4 1.9 2.8 3.4 Coat	2.3 3.2 4.7 5.7	Reference O Reference O Reference O
31.9 42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF Hopper Kg Weight	1.9 2.8	3.2 4.7 5.7	Reference Only Reference Only Reference Only Not adjustable with Curr	31.9 42.8 53.4 ent Interface to Metco Multi	1.9 2.8 3.4 Coat	3.2 4.7 5.7	Reference Or Reference Or
42.8 53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF 3NGF	2.8	4.7 5.7	Reference Only Reference Only Not adjustable with Curr	42.8 53.4 ent Interface to Metco Multi	2.8 3.4 Coat	4.7 5.7	Reference Or
53.4 Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF Hopper Kg Weight		5.7	Reference Only Not adjustable with Curr	53.4 ent Interface to Metco Multi	3.4 Coat	5.7	
Serial Numbers: 3NGF 3NGF 3NGF 3NGF 3NGF Hopper Kg Weight	3.4		Not adjustable with Curr	ent Interface to Metco Multi	Coat	• • •	Reference O
3NGF 3NGF 3NGF 3NGF 3NGF Hopper Kg Weight		 The Vibrator is used onl				the gas steam.	
3NGF 3NGF 3NGF 3NGF 3NGF Hopper Kg Weight		The Vibrator is used onl	y to keep powder flowin	g down to where the pick	up shaft can suck it into	the gas steam.	
3NGF 3NGF 3NGF 3NGF Hopper Kg Weight							
3NGF 3NGF 3NGF Hopper Kg Weight							
3NGF 3NGF Hopper Kg Weight							
3NGF Hopper Kg Weight							
Hopper Kg Weight							
		1					
		NIST Hopper Kg Weight		Hopper Kg Weight			
		As Left	Deviation As Found	% of Deviation			
0.00	0.00	1.00	0.00	0.00			
0.00	0.00	2.00	0.00	0.00			
-0.01	-0.07	14.99	-0.01	-0.07			
		7					
Honnor Prossure	Honnor Broccuro						
Hopper Pressure							
Hopper Pressure NIST Manometer	Hopper Pressure NIST As Left [2nd]	4					
	0.00 0.00 0.00 -0.01	0.00 0.00 0.00 0.00 0.00 0.00 -0.01 -0.07	0.00 0.00 4.00 0.00 0.00 5.00 0.00 0.00 10.00 -0.01 -0.07 14.99	0.00 0.00 4.00 0.00 0.00 0.00 5.00 0.00 0.00 0.00 10.00 0.00 -0.01 -0.07 14.99 -0.01	0.00 0.00 4.00 0.00 0.00 0.00 0.00 5.00 0.00 0.00 0.00 0.00 10.00 0.00 0.00 -0.01 -0.07 14.99 -0.01 -0.07	0.00 0.00 4.00 0.00 0.00 0.00 0.00 5.00 0.00 0.00 0.00 0.00 10.00 0.00 0.00 -0.01 -0.07 14.99 -0.01 -0.07	0.00 0.00 4.00 0.00 0.00 0.00 0.00 5.00 0.00 0.00 0.00 0.00 10.00 0.00 0.00 -0.01 -0.07 14.99 -0.01 -0.07



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Customer:

Universal Therma

Nitrogen Carrier Gas Flow-HVOF

			C	#1 9MP-	DJ-CL		Form Number:	F-315-026 Rev.		16-Oct-
ertificate Number:	2023-035								Page:	16 of 16
vder Feeder #2:	9MPE-DJ-CL		A9MPEDJCL2030908-1							
rice ID Number: rice Under Test:	PTS 168 Porter Mass Flow Cntr.	Booth Number: Device S/N:	1 M8209620B	Scale Rate:	Flow is in SCFH	Full Scale [FS]:	37.8 Scfh	Type of Gas:	Nitrogen	
nce onder rest.	FUITEI MIASS FIUW CITI.	Device 3/N.	W0209020D	Scale Rate.		Full Scale [FS].	37.0 3011	Type of Gas.	Nillogen	
ting Instrument:	Alicat 75 scfh	PCU	Serial Number:	299411						
SCFH	SCFH Indicated		As Found	As Found Actual	As Found SCFH	Tolerence	As Left	As Left	As Left SCFH	Tole
Set Point	On Display		Actual SCFH	SCFH Deviation	% Deviation	Pass/Fail	Actual SCFH	SCFH Deviation	% Deviation	Pase
10	10		10.0	0.0	-0.1	Pass	10.0	0.0	-0.1	P
15	15		15.0	0.0	0.1	Pass	15.0	0.0	0.1	P
<u>20</u> 25	20 25		20.2 25.3	0.2	0.5	Pass Pass	20.2 25.3	0.2	0.5	P
30	30		30.4	0.4	1.0	Pass	30.4	0.4	1.0	P
35	34.8		35.3	0.5	1.3	Pass	35.3	0.5	1.3	P
15 10	.0									
	.0 +									
	.0		2	3		4		5	6	
	1		2 15.0	3 20.2		4 25.3		5 30.4	6 35.3	
0	1 ound 10.0									