



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

# CERTIFICATE OF CALIBRATION

**LUDLUM MEASUREMENTS, INC.**

501 Oak Street  
325-235-5494

☐ 10744 Dutchtown Road  
865-392-4601

Sweetwater, TX 79556, U.S.A.

Knoxville, TN 37932, U.S.A.

CUSTOMER ERG

ORDER NO. 20301042/443117

Mfg. Thermo

Model

MICRO REM

Serial No. 2079

Mfg.

Model

Serial No.

Cal. Date 29-Nov-16

Cal Due Date

29-Nov-17

Cal. Interval

1 Year

Meterface

N/A

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec.

T.

73 °F

RH

29 %

Alt

698.0 mm Hg

☐ New Instrument

Instrument Received

☐ Within Toler.  $\pm 10\%$

☐ 10-20%

☒ Out of Tol.

☐ Requiring Repair

☐ Other-See comments

☒ Mechanical ck.

☒ Meter Zeroed

☐ Background Subtract

☐ Input Sens. Linearity

☒ F/S Resp. ck

☒ Reset ck.

☐ Window Operation

☒ Geotropism

☐ Audio ck.

☐ Alarm Setting ck.

☐ Batt. ck. (Min. Volt) \_\_\_\_\_ VDC

☐ Calibrated in accordance with LMI SOP 14.8

☒ Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set \_\_\_\_\_ V Input Sens. \_\_\_\_\_ mV Det. Oper. \_\_\_\_\_ V at \_\_\_\_\_ mV Threshold \_\_\_\_\_ mV  
Dial Ratio \_\_\_\_\_ =

☐ HV Readout (2 points)

Ref./Inst. \_\_\_\_\_ / \_\_\_\_\_

V Ref./Inst. \_\_\_\_\_ / \_\_\_\_\_

V

## COMMENTS:

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X 1000	150 mR/hr	150	150
X 1000	50 mR/hr	45	45
X 100	15 mR/hr	150	150
X 100	5 mR/hr	45	45
X 10	1500 $\mu$ R/hr	150	150
X 10	500 $\mu$ R/hr	50	50
X 1	150 $\mu$ R/hr	190	150
X 1	100 $\mu$ R/hr	125	100
X 0.1	15 $\mu$ R/hr	150	150
X 0.1			

\*Uncertainty within  $\pm 10\%$  C.F. within  $\pm 20\%$

Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout			Log Scale		

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques.

The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978

State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 S/N ☐ 059 ☐ 2171CP ☐ 2261CP ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 1909 ☐ 1916CP ☐ 2324/2521  
☐ 5717CO ☐ 5719CO ☐ 60646 ☐ 70897 ☐ 73410 ☐ E552 ☒ G112 ☒ 2168CP ☐ S-394 ☐ S-1054 ☐ T10081 ☐ T10082 Neutron Am-241 Be ☐ T-304 Ra-226 ☐ Y982

☐ Alpha S/N \_\_\_\_\_

☐ Beta S/N \_\_\_\_\_

☒ Other

Cs137#NES-356 GRN

☐ m 500 S/N \_\_\_\_\_

☐ Oscilloscope S/N \_\_\_\_\_

☐ Multimeter S/N \_\_\_\_\_

Calibrator

*James McLeod*

Title Calibrator

Date 29 NOV 16

QC'd By

*Paul H.*

Title

Service Dept. OK

Date

29 Nov 16



# Certificate of Calibration

## Air Sampler Calibration Form

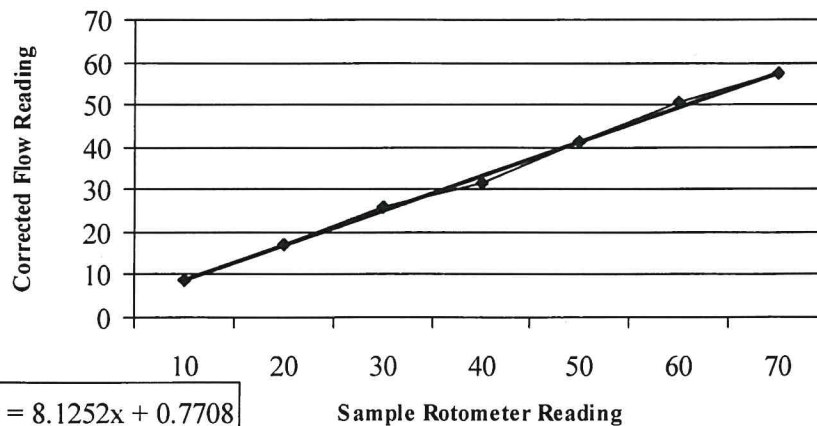
Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Sampler: Manufacturer: Eberline Model Number: RAS-1 Serial Number: 408667-8  
Warm up Time 30 min Temperature: 75 °F Relative Humidity 20 % Barometric Pressure: 24.6 in. Hg  
Correction Factor: 0.899227

Sampler Rotometer Calibrator Flow Meter Corrected Flow

10	10	8.992275
20	19	17.08532
30	29	26.0776
40	35	31.47296
50	46	41.36446
60	56	50.35674
70	64	57.55056

Calibration Chart



Correction Factor =  $(A * B)^{0.5}$  Corrected Flow = Calibrated Flow Meter \* Correction Factor

$$A = \frac{\text{Barometric Pressure in inches of Hg.}}{29.92} \quad B = \frac{529.67}{459.67 + ^\circ\text{F}} * \frac{181.87}{\mu_{\text{air}}}$$

$$\mu_{\text{air}} = \frac{14.58 \left( \frac{459.67 + ^\circ\text{F}}{1.8} \right)^{3/2}}{110.4 + \left( \frac{459.67 + ^\circ\text{F}}{1.8} \right)}$$

Comments:

### Reference Instrument:

Air Flow Calibrator: ☐ AFC-85L sn: 6042

☐ HFC-SIDE-60C sn: 12723

Calibrated By:

Calibration Date: 2/14/17

Calibration Due: 2/14/18

Reviewed By:

Review Date: 14 Feb 2017



# Certificate of Calibration

## Air Sampler Calibration Form

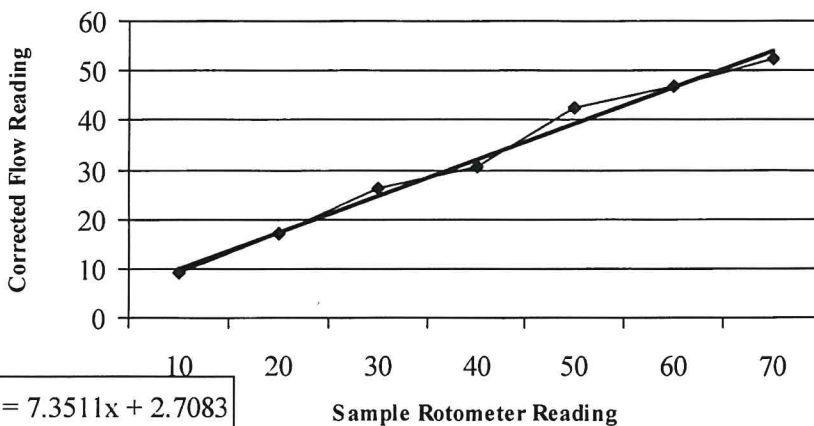
Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Sampler: \_\_\_\_\_ Manufacturer: Eberline Model Number: RAS-1 Serial Number: 405685-3  
Warm up Time 20 min Temperature: 73 °F Relative Humidity 20 % Barometric Pressure: 24.63 in. Hg  
Correction Factor: 0.902767

Sampler Rotometer Calibrator Flow Meter Corrected Flow

10	10	9.027671
20	19	17.15257
30	29	26.18024
40	34	30.69408
50	47	42.43005
60	52	46.94389
70	58	52.36049

Calibration Chart



Correction Factor =  $(A * B)^{0.5}$  Corrected Flow = Calibrated Flow Meter \* Correction Factor

$$A = \frac{\text{Barometric Pressure in inches of Hg.}}{29.92}$$

$$B = \frac{529.67}{459.67 + ^\circ\text{F}} * \frac{181.87}{\mu_{\text{air}}}$$

$$\mu_{\text{air}} = \frac{14.58 \left( \frac{459.67 + ^\circ\text{F}}{1.8} \right)^{3/2}}{110.4 + \left( \frac{459.67 + ^\circ\text{F}}{1.8} \right)}$$

Comments:

### Reference Instrument:

Air Flow Calibrator: ☐ AFC-85L sn: 6042

☐ HFC-SIDE-60C sn: 12723

Calibrated By: \_\_\_\_\_

Calibration Date: 14 Feb 2017 Calibration Due: 14 Feb 2017

Reviewed By: \_\_\_\_\_

Review Date: 2/14/17



# Certificate of Calibration

## Calibration and Efficiency Determination

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 12 Serial Number: 276863  
Detector: Manufacturer: Ludlum Model Number: 44-9 Serial Number: PR147787

☒ Mechanical Check ☒ THR/WIN Operation HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V  
☒ F/S Response Check ☒ Reset Check Cable Length: ☒ 39-inch ☐ 72-inch ☐ Other:  
☒ Geotropism ☒ Audio Check  
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC) Barometric Pressure: 24.42 inches Hg  
Source Distance: ☒ Contact ☐ 6 inches ☐ Other: Threshold: 40 mV Temperature: 75 °F  
Source Geometry: ☐ Side ☒ Below ☐ Other: Window: Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"		Meter Reading		Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	kcpm	400	kcpm	400	kcpm
x 1000	100	100	kcpm	100	kcpm	100	kcpm
x 100	400	400	kcpm	400	kcpm	400	kcpm
x 100	100	100	kcpm	100	kcpm	100	kcpm
x 10	400	400	kcpm	400	kcpm	400	kcpm
x 10	100	100	kcpm	100	kcpm	100	kcpm
x 1	400	400	cpm	400	cpm	400	cpm
x 1	100	100	cpm	100	cpm	100	cpm

Gross Tc-99 counts (cpm): 2500  
Background counts (cpm): 70  
Net Tc-99 Counts (cpm): 2430

Gross Sr/Y-90 counts (cpm):  
Background counts (cpm):  
Net Sr/Y-90 counts (cpm):

Comments:

### Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932  
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03  
☒ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 87490128  
☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03  
☐ Other Source:

Calibrated By: 

Calibration Date: 7 Feb 2017 Calibration Due: 7 Feb 2018

Reviewed By: 

Review Date: 2/7/17





# Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Meter/Detector: Manufacturer: Ludlum Model Number: 2929 & 43-10-1 Serial Number: 200051 & PR215948

- ☒ Mechanical Check ☒ THR/WIN Operation  
☐ F/S Response Check ☐ Reset Check  
☐ Geotropism ☒ Audio Check  
☐ Meter Zeroed ☐ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V

Cable Length: ☒ 39-inch ☐ 72-inch ☐ Other:

Source Distance: ☐ Contact ☐ 6 inches ☒ Other: In planchet  
Source Geometry: ☐ Side ☐ Below ☒ Other: In planchet

Alpha Threshold: 170 mV Barometric Pressure: 24.42 inches Hg

Beta Threshold: 4 mV Temperature: 74 °F

Beta Window: 46 mV Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	Integrated 1-Min. Count "As Found"		Integrated 1-Min. Count "Reading"	
		$\alpha$	$\beta$	$\alpha$	$\beta$
x 1000	400 Kcpm	399766	399773	399766	399773
x 100	40 Kcpm	39980	39980	39980	39980
x 10	4 Kcpm	3998	3998	3998	3998
x 1	400 cpm	400	399	400	399

High Voltage	Pot. Setting	Alpha Source		Beta Source		Background	
		$\alpha$	$\beta$	$\alpha$	$\beta$	$\alpha$	$\beta$
500	2	3426	306	3	784	0	13
550	2.24	4521	263	6	2322	0	49
600	2.48	4708	436	4	3560	1	53
650	2.68	4650	863	4	4631	1	73

Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 600, Pot. setting = 2.48

## Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

☒ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03

☒ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number ☐ 87490128

☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Other Source:

Calibrated By:

Calibration Date: 6 Dec 16 Calibration Due: 6 Dec 17

Reviewed By:

Date:

12/6/16



# Certificate of Calibration

## Calibration and Voltage Plateau

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

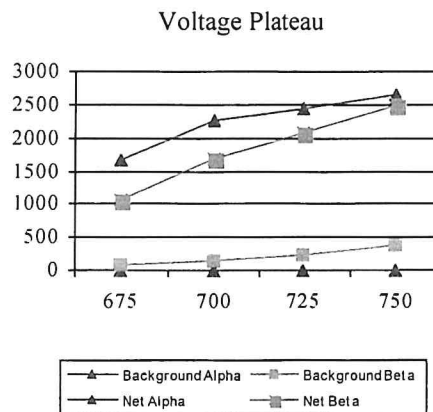
Meter: Manufacturer: Ludlum Model Number: 2360 Serial Number: 184909  
Detector: Manufacturer: Ludlum Model Number: 43-93 Serial Number: PR298426

☒ Mechanical Check ☒ THR/WIN Operation HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V  
☐ F/S Response Check ☒ Reset Check Cable Length: ☒ 39-inch ☐ 72-inch ☐ Other:  
☒ Geotropism ☒ Audio Check  
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC) Alpha Threshold: 120 mV Barometric Pressure: 24.51 inches Hg  
Source Distance: ☒ Contact ☐ 6 inches ☐ Other: Beta Threshold: 4 Temperature: 76 °F  
Source Geometry: ☐ Side ☒ Below ☐ Other: Beta Window: 30 mV Relative Humidity 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	
				$\alpha$	$\beta$
x 1000	400 Kcpm	400	400	399826	399835
x 1000	100 Kcpm	100	100		
x 100	40 Kcpm	400	400	39985	39986
x 100	10 Kcpm	100	100		
x 10	4 Kcpm	400	400	3998	3997
x 10	1 Kcpm	100	100		
x 1	400 cpm	400	400	400	399
x 1	100 cpm	100	100		

High Voltage	Alpha Source		Beta Source		Background	
	$\alpha$	$\beta$	$\alpha$	$\beta$	$\alpha$	$\beta$
675	1676	352	7	1153	3	82
700	2255	366	8	1843	8	158
725	2437	495	7	2317	1	226
750	2646	579	4	2871	5	378



Comments: HV Plateau Scaler Count Time = 1 min. Recommended HV = 725

### Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number ☒ 87490128

☒ Alpha Source: Th-230 (s/n 4098-03) 12,800 dpm on 1/4/12

☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☒ Beta Source: Tc-99 (sn: 4099-03) 17,700 dpm on 1/4/12

☐ Other Source:

Calibrated By:

Calibration Date: 1/16/17

Calibration Due: 4/16/18

Reviewed By:

Date: 1/16/17

ERG Form ITC. 101.C

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997



# Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2360 Serial Number: 202403  
Detector: Manufacturer: Ludlum Model Number: 43-37 Serial Number: PR178371

☒ Mechanical Check ☒ THR/WIN Operation HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V  
☐ F/S Response Check ☒ Reset Check Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"  
☒ Geotropism ☒ Audio Check  
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC) Alpha Threshold: 100 mV Barometric Pressure: 24.86 inches Hg  
Source Distance: ☒ Contact ☐ 6 inches ☐ Other: Beta Threshold: 4 Temperature: 75 °F  
Source Geometry: ☐ Side ☒ Below ☐ Other: Beta Window: 40 mV Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	
				$\alpha$	$\beta$
x 1000	400 Kcpm	400	400	399634	399649
x 1000	100 Kcpm	100	100		
x 100	40 Kcpm	400	400	39964	39965
x 100	10 Kcpm	100	100		
x 10	4 Kcpm	400	400	3993	3993
x 10	1 Kcpm	100	100		
x 1	400 cpm	400	400	399	399
x 1	100 cpm	100	100		

High Voltage	Alpha Source		Beta Source		Background		
	$\alpha$	$\beta$	$\alpha$	$\beta$	$\alpha$	$\beta$	
1550	1780	1293	1	3838	2	480	
1575	2088	1506	4	4504	7	626	
1600	2053	1661	6	5040	7	805	
1625	2308	1873	5	5320	6	1028	

Comments: HV Plateau Scaler Count Time = 1 min. Recommended HV = 1600

## Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number ☒ 87490128

☒ Alpha Source: Th-230 (sn 4098-03) 12,800 dpm on 1/4/12

☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☒ Beta Source: Tl-204 (sn 4099-03) 17,700 dpm on 1/4/12

☐ Other Source:

Calibrated By:

Calibration Date: 11-4-16 Calibration Due 11-4-17

Reviewed By:

Date: 11/04/16

ERG Form ITC. 101.C

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997





# Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2360 Serial Number: 193638

Detector: Manufacturer: Ludlum Model Number: 43-93 Serial Number: PR199836

☒ Mechanical Check ☒ THR/WIN Operation HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V

☐ F/S Response Check ☒ Reset Check Cable Length: ☒ 39-inch ☐ 72-inch ☐ Other:

☒ Geotropism ☒ Audio Check

☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

Source Distance: ☒ Contact ☐ 6 inches ☐ Other:

Source Geometry: ☐ Side ☒ Below ☐ Other:

Alpha Threshold: 120 mV Barometric Pressure: 24.39 inches Hg

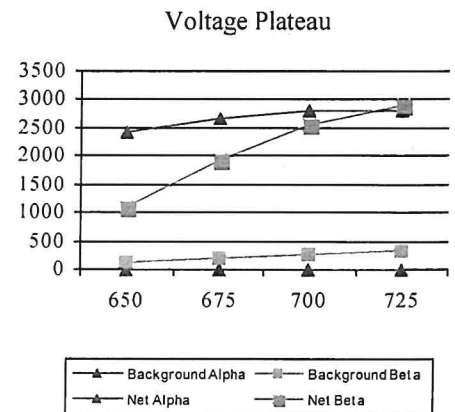
Beta Threshold: 4 Temperature: 73 °F

Beta Window: 30 mV Relative Humidity 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	
				$\alpha$	$\beta$
x 1000	400 Kcpm	400	400	397888	397923
x 1000	100 Kcpm	100	100		
x 100	40 Kcpm	400	400	39787	39799
x 100	10 Kcpm	100	100		
x 10	4 Kcpm	400	400	3981	3980
x 10	1 Kcpm	100	100		
x 1	400 cpm	400	400	398	398
x 1	100 cpm	100	100		

High Voltage	Alpha Source		Beta Source		Background	
	$\alpha$	$\beta$	$\alpha$	$\beta$	$\alpha$	$\beta$
650	2429	320	4	1255	5	135
675	2687	391	12	2131	3	191
700	2817	539	10	2836	1	270
725	2824	741	7	3269	8	356



Comments: HV Plateau Scaler Count Time = 1 min. Recommended HV = 700

## Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number ☒ 87490128

☒ Alpha Source: Th-230 (s/n 4098-03) 12,800 dpm on 1/4/12

☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☒ Beta Source: Tc-99 (sn: 4099-03) 17,700 dpm on 1/4/12

☐ Other Source:

Calibrated By:

Calibration Date: 2/7/17

Calibration Due: 2/7/18

Reviewed By:

Date: 2 Feb 2017

ERG Form ITC. 101.C

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997





# Certificate of Calibration

## MSA Lapel Air Sampler Calibration Form

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Manufacturer: MSA

Model Number: Escort ELF Lapel Air Sampler

Serial Number: A3-48588

Temperature: 72 °F

Relative Humidity: 20 %

Barometric Pressure: 24.92 in. Hg

Single point calibration at two different flow rates. Actual flow rate is expressed as average of six tests. Sampler flow rate adjusted to match average.

Digital Flow Run Number	Test 1 (2000 cc/min)	Test 2 (3000 cc/min)
1	2066	2810
2	2071	2957
3	1916	2847
4	2071	2969
5	2083	2901
6	1967	3051

Average: 2029.0

2922.5

Adjustment Set: ☒

☒

Flow Fault Check: ☒

Final Flow Setting: 2.5 LPM

Comments:

### Reference Instrument:

Air Flow Calibrator: ☒ MSA DIGICAL Calibrator sn: 020158

☐ A.P. Buck mini-Buck Calibrator sn: 053058

Calibrated By:

Calibration Date:

12/29/16

Reviewed By:

Review Date:

12/29/16



# Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2221r Serial Number: 190205

Detector: Manufacturer: Ludlum Model Number: FIDLER Serial Number: 010807D

☒ Mechanical Check ☒ THR/WIN Operation  
☒ F/S Response Check ☒ Reset Check  
☒ Geotropism ☒ Audio Check  
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V

Cable Length: ☐ 39-inch ☐ 72-inch ☒ Other: 60"

Source Distance: ☐ Contact ☐ 6 inches ☒ Other: 1/2 "

Threshold: 10 mV

Barometric Pressure: 24.42 inches Hg

Temperature: 74 °F

Source Geometry: ☐ Side ☒ Below ☐ Other:

Window:

Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399325	400
x 1000	100	100	100		100
x 100	400	400	400	39933	400
x 100	100	100	100		100
x 10	400	400	400	3993	400
x 10	100	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage

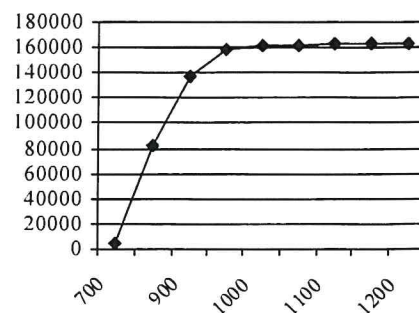
Source Counts

Background

Voltage Plateau

700	4140
800	82919
900	136675
950	157963
1000	161842
1050	162184
1100	163399
1150	163508
1200	163966

5070



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV = 1050

## Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932  
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03  
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 87490128  
☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03  
☒ Other Source: Am-241 @ 1uCi

Calibrated By:

Reviewed By:

Calibration Date: 7 Feb 2017 Calibration Due: 7 Feb 2018

Date: 2/7/17

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.A - 1997



# Certificate of Calibration

## Calibration and Voltage Plateau

Environmental Restoration Group, Inc.  
8809 Washington St NE, Suite 150  
Albuquerque, NM 87113  
(505) 298-4224  
www.ERGoffice.com

Meter: Manufacturer: Ludlum Model Number: 2360 Serial Number: 220242

Detector: Manufacturer: Ludlum Model Number: Serial Number:

- ☒ Mechanical Check ☒ THR/WIN Operation  
☐ F/S Response Check ☒ Reset Check  
☒ Geotropism ☒ Audio Check  
☒ Meter Zeroed ☒ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ☒ 500 V ☒ 1000 V ☒ 1500 V

Cable Length: ☒ 39-inch ☐ 72-inch | Other:

Source Distance: ☒ Contact ☐ 6 inches ☐ Other:

Source Geometry: ☐ Side ☒ Below ☐ Other:

Alpha Threshold: 120 mV Barometric Pressure: 24.6 inches Hg

Beta Threshold: 4 Temperature: 74 °F

Beta Window: 30 mV Relative Humidity: 20 %

Instrument found within tolerance: ☒ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	
				$\alpha$	$\beta$
x 1000	400 Kcpm	400	400	400430	400469
x 1000	100 Kcpm	100	100		
x 100	40 Kcpm	400	400	40079	40083
x 100	10 Kcpm	100	100		
x 10	4 Kcpm	400	400	4005	4004
x 10	1 Kcpm	100	100		
x 1	400 cpm	400	400	400	400
x 1	100 cpm	100	100		
High Voltage	Alpha Source $\alpha$ $\beta$	Beta Source $\alpha$ $\beta$	Background $\alpha$ $\beta$	Voltage Plateau	

Comments: HV Plateau Scaler Count Time = 1 min. HV = 500

### Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☒ 201932

Fluke multimeter serial number ☐ 87490128

☐ Alpha Source: Th-230 (s/n 4098-03) 12,800 dpm on 1/4/12

☐ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03

☐ Beta Source: Tc-99 (sn: 4099-03) 17,700 dpm on 1/4/12

☐ Other Source:

Calibrated By:

Calibration Date: 2/13/17

Calibration Due: 2/13/18

Reviewed By:

Date: 2/13/17

ERG Form ITC. 101.C

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323.4 - 1997