Designer and Manufacturer of Scientific and Industrial Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
501 Oak Street
325-235-5494
Sweetwater, TX 79556, U.S.A.
☐ 231 Sam Rayburn Parkway
865-270-8962
Lenoir City, TN 37771, U.S.A.

CUSTOMER CABRERA SERVICES ORDER NO. 20215937/387745

Mfg. Ludlum Measurements, Inc. Model 3 Serial No. 79511

Mfg. Ludlum Measurements, Inc. Model 44-9 Serial No. PR 137459

Cal. Date 5-Feb-13 Cal Due Date 5-Feb-14 Cal. Interval 1 Year Meterface 202-002

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 20 % Alt 699.8 mm Hg

☐ New Instrument Instrument Received ☑ Within Toler. +-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) 2.2 VDC
☑ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 900 V Input Sens. 26 mV Det. Oper. 900 V at 26 mV Threshold Dial Ratio = mV

☐ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

COMMENTS:

4 Pi EFF. FOR Tc99: 24.06 %
Source S/N: 5296 .
Background: 41 cpm.
Source Count: 8,000 cpm.
Source Activity: 33,077 dpm.

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*
x100	400 K cpm	4 K	4 K
x100	100 K cpm	1 K	1 K
x10	40 K cpm	4 K	4 K
x10	10 K cpm	1 K	1 K
x1	4 K cpm	4 K	4 K
x1	1 K cpm	1 K	1 K
x0.1	400 cpm	3.9 K	4 K
x0.1	100 cpm	1 K	1 K

*Uncertainty within ± 10% C.F. within ± 20%

ALL **Range(s) Calibrated Electronically**

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

	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
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: ☐ 059 ☑ 280 ☐ 720 ☐ 734 ☐ 781 ☐ 1131 ☐ 1616 ☐ 1696 ☐ 5105 ☐ 5717CO ☐ 5719CO
☐ 60646 ☐ 70897 ☐ 73410 ☑ E551 ☐ E552 ☑ G112 ☐ M565 ☐ S-394 ☐ S-1054 ☐ T-304 ☐ T879 ☐ T10081 ☐ T10082 ☐ Y982

☐ Alpha S/N ☐ Beta S/N ☐ Other

☑ m 500 S/N 189506 ☐ Oscilloscope S/N ☑ Multimeter S/N 3810039

Calibrated By: William Tinsley Date 5 February - 2013

Reviewed By: Donnie Miekos Date 7-Feb-13

AC Inst. Only ☐ Passed Dielectric (Hi-Pot) and Continuity Test ☐ Failed:

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CONVERSION CHART

Customer CABRERA SERVICES Date 5-Feb-13 Order #. 20215937/387745

Model 3 Serial No. 79511 Detector Model 44-9 Serial No. PR 137499

Source Cs^{137}: 194.6 mCi; Cs^{137}: 21 mCi High Voltage 900 V

Input Sensitivity 26 mV

Reference Point	"As Found" Readings (CPM): Meter Reading	Range/Scale	After Adjustment Readings (CPM): Meter Reading	Range/Scale
150 mR/hr	1.6 K	X 100	1.6 K	X 100
50 mR/hr	1 K	X 100	1 K	X 100
15 mR/hr	4.1 K	X 10	4.1 K	X 10
5 mR/hr	1.6 K	X 10	1.6 K	X 10
1.5 mR/hr	0.5 K	X 10	0.5 K	X 10
1.0 mR/hr	3.2K	X 1	3.2K	X 1

Signature: William Tinsley Date 5 February 2013