



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.

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10744 Dutchtown Road
865-392-4601
Knoxville, TN 37932, U.S.A.

CUSTOMER CABRERA SERVICES

ORDER NO. 20277004/207087

Mfg. Ludlum Measurements, Inc. Model 2221 Serial No. 161580

Mfg. Thermo Fisher Model G5 Serial No. 061810A

Cal. Date 13-Oct-15 Cal Due Date 13-Oct-16 Cal. Interval 1 Year Meterface 202-159

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 47 % Alt 700.0 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) 4.4 VDC

Calibrated in accordance with LMI SOP 14.8 Calibrated in accordance with LMI SOP 14.9

Instrument Volt Set 900 V Input Sens. 10 mV Det. Oper. 900 V at 10 mV Threshold Dial Ratio 100 = 10 mV

HV Readout (2 points) Ref./Inst. 500 / 497 V Ref./Inst. 2000 / 1997 V

COMMENTS:

Firmware: 261027
Calibrated with 5' cable. Calibrated with window in "OUT" position.
High Voltage set with detector connected.

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*	
x1K	400kcpm	NA	400	
x1K	100kcpm		100	
x100	40kcpm		400	
x100	10kcpm		100	
x10	4kcpm		400	
x10	1kcpm		100	
x1	400cpm		400	
x1	100cpm		100	

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

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400kcpm	NA	400		500kcpm	NA	500
40kcpm		3996		50kcpm		50
4kcpm		399		5kcpm		5
400cpm		40		500cpm		500
40cpm		4		50cpm		50

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 5105 5717CO
 5719CO 60646 70897 73410 E552 G112 M565 S-394 S-1054 T10081 T10082 Neutron Am-241 Be S/N: T-304 Ra-226 S/N: Y982

Alpha S/N _____ Beta S/N _____ Other 1129:1058-60

m 500 S/N 289158 Oscilloscope S/N _____ Multimeter S/N 93870637

Calibrated By: [Signature] Date 13-Oct-15

Reviewed By: [Signature] Date 14 Oct 15

AC Inst. Only	<input type="checkbox"/> Passed Dielectric (Hi-Pot) and Continuity Test
	<input type="checkbox"/> Failed:



Bench Test Data For Detector

Detector G5 Serial No. 061810A

Customer CABRERA SERVICES

Order # 20277004/207087

Counter 2221 Serial No. 161570

Counter Input Sensitivity 10 mV

Count Time 6 seconds

Distance Source to Detector Surface

Other _____

High Voltage	Background	Isotope <u>Tl-209</u> Size <u>2.0-0.76µCi</u>	Isotope _____ Size _____	Isotope _____ Size _____	Isotope _____ Size _____
800	715	6339			
850	710	6331			
*900	782	6290			
950	727	6404			
1000	1257	6603			

Signature [Signature]

Date 13-04-15