



LUDLUM MEASUREMENTS, INC.

2005 AMUG Meeting

March 22-24

Hosted by Los Alamos National Laboratory

LUDLUM MEASUREMENTS, INC.



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ANSI N42.17A Testing

- Testing Facility Capabilities
 - 4. General Characteristics
 - 5. Electronic and Mechanical Requirements
 - 5.7 Line Noise Susceptibility X
 - 6. Radiation Response
 - 6.5 Neutron Energy Dependence X
 - 7. Interfering Response
 - 7.2 Radio Frequency X
 - 7.3 Microwave Fields X
 - 7.4.2.2 60 Hz and 400 Hz Field Tests X
 - 7.5 Magnetic Fields
 - Can perform Magnetic Field Tests except for the 800 A/m test
 - 8. Environmental Factors
 - 8.5 Vibration X

ANSI N42.17A Testing



LMI ANSI Testing Facility

MODEL 43-40 SERIES Alpha Air Proportional Detectors



MODEL 43-40 SERIES Alpha Air Proportional Detectors

- Efficiency Determinations
 - Open Face (No protective screen) with source approximately 1/8" from surface
 - 79% Open Protective Screen with source directly on surface of screen
 - 6 second counts
 - Includes Special Charge Sensitive Amplifier with Sensitivity roughly equal to 0.25 – 0.5 mV

MODEL 43-40 SERIES Alpha Air Proportional Detectors

Pu-239 – 397,000 dpm

Voltage	Background	Open Count	Efficiency	79% Open Count	Efficiency
2000	1	12896	65%	8097	41%
1900	0	11507	58%	7119	36%
1800	0	10010	50%	6059	31%
1700	0	7901	40%	4876	25%
1600	0	3946	20%	2020	10%
1500	0	719	4%	358	2%

MODEL 43-40 SERIES Alpha Air Proportional Detectors

- 1 mV fixed Sensitivity reduces nominal efficiency to approximately 24 (2 pi)
- Altitude Change had no visible affect on efficiency (200 volts plateau shift noticed)

MODEL 3030E Alpha/Beta Scaler



MODEL 3030E Alpha/Beta Scaler

- The Model 3030 without the internal Sample Counter
- Can be used as replacement for Model 2929 Electronics
- Micro-processor based unit with RS-232 output and related software to allow for data-logging, MDA calculations, QC Checks, etc.

MODEL 3030E Alpha/Beta Scaler

LMI Model 3030 Control Software Version 1.0.7

File Parameters Help

General Settings | QC Check | HV Plateau | **MDA Calculations** | Data Logging

Alpha Background (cpm): Alpha Efficiency (%):
Beta Background (cpm): Beta Efficiency (%):

Count Time (min)	Alpha MDA (dpm)	Beta MDA (dpm)
0.1	95.0	417.0
0.5	27.8	182.9
1.0	18.4	142.4
2.0	13.5	119.4
5.0	10.4	104.1
10.0	9.3	98.7
60.0	8.4	94.0
PC (1.0)	18.4	142.4

Formula

$$\text{MDA (dpm)} = \frac{2.71 + \text{CL} * \text{SQR}(\text{Background} * \text{Ts} * (1 + (\text{Ts} / \text{Tb})))}{\text{E} * \text{Ts}}$$

Tb = Background Count Time (min) Select Confidence Level
Ts = Source Count Time (min) 90% = 2.5632
E = Counter Efficiency 95% = 3.290
CL = Confidence Level 99% = 4.6526

Done 9:06 AM 4/20/01 39013N06

MODEL 3030E Alpha/Beta Scaler

LMI Model 3030 Control Software Version 1.0.7

File Parameters Help

General Settings | QC Check | HV Plateau | MDA Calculations | Data Logging

Start Count Stop Count

Next Sample Number: 0008

User-defined comment: TEST

Logging Mode: Log All

Recycle On

Printer Mode On

Get Samples Clear Samples

Sample #	Date	Time	Alpha Count	Beta Count	Count Time	Type	Comment
0001	04/20/01	09:10:50	0	30	1.0	S	TEST
0002	04/20/01	09:28:21	0	3	0.1	S	TEST
0003	04/20/01	09:29:05	0	3	0.1	S	TEST
0004	04/20/01	09:29:14	0	1	0.1	S	TEST
0005	04/20/01	09:29:22	0	8	0.1	S	TEST
0006	04/20/01	09:29:38	0	2	0.1	S	TEST
0007	04/20/01	09:29:46	0	5	0.1	S	TEST

Save Samples Print Samples

9:34 AM 4/20/01 39013N06 Update

MODEL 3030E Alpha/Beta Scaler

LMI Model 3030 Control Software Version 1.0.7

File Parameters Help

General Settings | QC Check | **HV Plateau** | MDA Calculations | Data Logging

Starting High Voltage: Current Count Time (min):
Ending High Voltage: Background Count Time is 1 minute
High Voltage Increment:

Alpha Source Size: DPM μ Ci Isotope:
Beta Source Size:

High Voltage Plateau

High Volt	Alpha Source (Beta)	Beta Source (Alpha)	Alpha Bkgnd (cpm)	Beta Bkgnd (cpm)	% Al

Done 9:03 AM 4/20/01 39013N06

MODEL 195 Survey Meter with MODEL 43-132 Alpha Ion Chamber



MODEL 195 Survey Meter with MODEL 43-132 Alpha Ion Chamber

- High level alpha detection
- Also sensitive to beta gamma
- Initial design as a disposable detector for Glove Box characterization

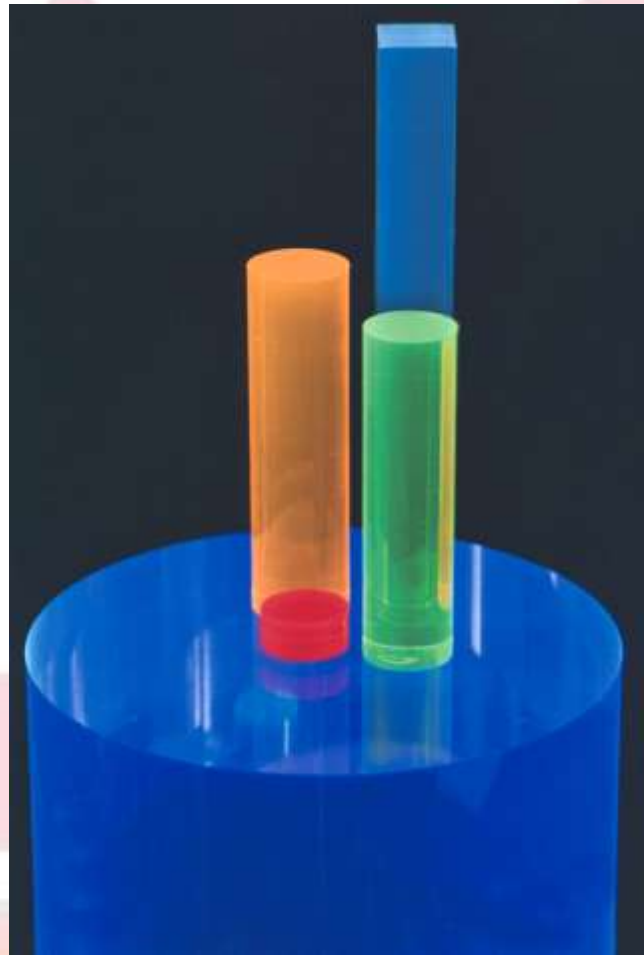
LUDLUM MEASUREMENTS, INC.

- Designing and Manufacturing Quality Instrumentation since 1962
- ANSI N42.17A Testing Facility
- Full Integrated manufacturing Facility
 - R&D Engineering Department
 - Fully Integrated Machine Shop
 - New Assembly Plant 2003

ADIT



ELJEN TECHNOLOGY



WEST TEXAS MOLDING



LUDLUM MEASUREMENTS, INC.

- Working towards ISO 9000 Compliance
- Still Interested in “Weirds and Specials”
- Always willing to support the customer any way we can

LUDLUM MEASUREMENTS, INC.

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