nuclear-chicago

nuclear INSTRUMENT & CHEMICAL CORPORATION

PRECISION INSTRUMENTS • RADIOCHEMICALS • PACKAGED LABORATORIES • ACCESSORIES

for your Radioisotope Applications

ONE YEAR WARRANTY

The Nuclear-Chicago original one year warranty is your assurance for a full year after purchase that the instrument we supply you will give full satisfaction and reliability. With the exception of such items as geiger tubes, vacuum tubes and batteries, the company warrants all equipment manufactured by it to be free from defects in workmanship or materials under normal use and service for a full year. If any part of such equipment proves to be defective in workmanship or materials, within one year after original date of shipment, it will be repaired or replaced without charge.

NINETY DAY WARRANTY

Some Nuclear-Chicago products such as geiger tubes, are inherently of shorter life than equipment such as scalers, and are, therefore, warranted for a shorter period. To safeguard you against defects, all geiger tubes, Super Sniffers, and a few other items are warranted to provide satisfactory operation for 90 days after date of shipment, and repair or replacement of any defective product will be made at no charge within that period.

TERMS OF WARRANTY — All repairs or replacements under the above warranties are furnished f.o.b. company's factory, or company's authorized service representative. If any question arises within these warranty periods, contact the company or its nearest district office for assistance or instructions. Please note that our obligation is limited to repair or replacement, but does not include shipping costs.

In the following catalog pages a footnote indicates the warranty which applies to each product.

THIRTY DAY COURTESY PERIOD

In order to provide you with complete assurance that the instrument you receive is in perfect operating condition, our exclusive 30 day courtesy period provides you with any necessary calls, repairs, or replacements, including shipping costs, *without* charge, up to 30 days after date of original shipment. It is, therefore, recommended that you make an operational check of any unit received by you immediately after receipt from the carrier.

SHIPPING DAMAGE — The company is not responsible for instrument damage which occurs during shipment, but it is our practice to make every effort to obtain restitution from the carrier. If you receive an instrument which is damaged in any respect, an immediate inspection by the carrier should be requested. The carrier's inspection report should then be sent to us and we will make arrangements for repair or replacement of the equipment. You will be promptly advised as to whether the equipment should be returned to us or a repair or replacement made by us or our service representative so that you may obtain the use of your counting equipment at the earliest possible moment.

Effective August 19, 1953

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Catalog M Price List

SUGGESTED INSTRUMENT GROUPS	Catalog Page	Price
Carbon Laboratory No. 1	5	$1,575.00
General Laboratory No. 2	5	1,725.00
Research Laboratory No. 3	5	2,850.00
Basic Laboratory	12	572.50
Minimum Laboratory	11	412.50
SCALING UNITS		
Model 182 Ampli-Count Scaler	8	850.00
Model 182A Ampli-Count Scaler	8	750.00
Extra for 5000 volt supply on above scalers		25.00
Model 183 Count-o-Matic Scaler	9	850.00
Model 183A Count-o-Matic Scaler	9	750.00
Model 172 Ultrascaler	10	1,050.00
Model 180 Rediscaler	11	275.00
Model 161 Basic Scaler	12	425.00
Model 165 Basic Scaler	12	425.00
Model 166 Decade Scaler	12	475.00
COUNTING SYSTEMS		
Model C-110 Sample Changer	14	1,075.00
Automatic Sample Changing System	14	1,850.00
Model 1617 "Isotron"	15	1,200.00
Model CA-4 "Carette"	15	295.00
Model 1615B Analytical Rate Meter	16	300.00
Model 1615B with D33 Counter	16	375.00
Model 1615B with D34 Counter	16	385.00
Model C-100 "Actigraph"	33	295.00
Model LC-100 "Actigraph" Lab	33	1,175.00
Model LC-1 Liquid Counter Set	35	45.00
Model LB-1 Marinelli Beaker	35	6.00
Model LT-1 Test Tube	35	2.00/doz.
Bernstein-Ballentine Glassware	36	109.65
AREA MONITORS		
Model MR-10 Alarm Circuit	17	90.00
Guarditron Monitoring System	17	450.00
Model 1310 Remote Monitron	17	800.00
Model 1500 Hand and Foot Monitor	20	3,500.00
Model 3782 Neutron Thermopile	20	275.00
Model 3783 Moderator	20	on request
PERSONNEL PROTECTION		
Model 3341 Pocket Chamber	18	13.75
Model 541A Dosimeter	19	45.00
Model 2050A Charger-Reader	18	225.00
Model 561 Charger	19	50.00
Film Badges	19	on request
PORTABLE SURVEY INSTRUMENTS		
Model 2610A Count Rate Meter	21	225.00
Model 2610AP Count Rate Meter	21	245.00
Model 2611 Count Rate Meter	21	280.00
Model 2611P Count Rate Meter	21	300.00
Model 2581 "Zeuto"	22	225.00
Model 2585 "Cutie Pie"	22	245.00
Model 2111 "Pee Wee"	23	515.00
Model 2111 with Model DN-1	23	615.00
Model 2111 with Model DN-2	23	700.00
Model 2302 "Super Sniffer"	23	49.50

EDUCATIONAL INSTRUMENTS	Page Catalog	Price
Model 1613A "Classmaster"	24	$149.50
Model MR-1 Meter	24	35.00
Model 1413 "Cloudmaster"	25	99.00
Model 1413C	25	49.50
Kounter Kit	25	on request
DETECTORS		
Model D46A "Q-Gas" Counter (complete)	26	360.00
Model D45 Methane Flow Counter	26	395.00
Model DS-1 Scintillation Detector	27	450.00
Model DS-3 Scintillation Well Counter	—	975.00
Model 155 Probe Counter	16	75.00
Model 222 Mica Window Counter	16	37.50
Model D33 Mica Window Counter	28	37.50
Model D34 Mica Window Counter	28	47.50
Model D35 Mica Window Counter	28	50.00
Model 12 Bismuth Cathode Counter	28	75.00
Model 13 Bismuth Cathode Counter	28	95.00
Model D12 Geiger Counter	29	15.00
Model D22 Geiger Counter	29	15.00
Model D50 Geiger Counter	29	12.00
Model D51 Geiger Counter	29	11.50
Model D52 Geiger Counter	29	15.00
Model D76 Geiger Counter	29	5.00
Model AP1 Alpha Proportional Counter	29	30.00
Model AP2 Alpha Proportional Counter	29	35.00
Model DN-1 (See listing under Model 2111)	29	125.00
Model DN-2 (See listing under Model 2111)	29	225.00
Model 80 Geiger Counter	17	60.00
SHIELDS AND MOUNTS		
Model 3031B Shield and Manual Sample Changer	30	235.00
Model 3030A Iron Shield	30	210.00
Model 3029A Adjustable Lead Shield	30	65.00
Model 3029B-E Adjustable Lead Shield	30	35.00
Model 3029C Adjustable Lead Shield	30	75.00
Model 3029D Adjustable Lead Shield	30	55.00
Model 3035E Shielded Isotope Carrier	—	45.00
Model 3032 Lead Shield (for Model D46A only)	26	55.00
Model 3036 Lead Shield (for Model DS-1 only)	27	220.00
Model 3037 Lead Shield (for Model C-110 only)	14	200.00
Model 3038 Rectangular Lead Brick	35	11.00
Model 3039A Long Corner Brick	35	10.00
Model 3039B Short Corner Brick	35	3.50
Model 3039C Side Brick	35	7.00
Model 3039D Base Filler	35	5.00
Model M2 Mount	30	45.00
Model M3 "Soil-O-Cator" Mount	—	125.00
ELECTRONIC ACCESSORIES		
Model 1090A High Voltage Supply	31	500.00
Model 2091A Vibrator Power Supply	31	45.00
Model 1022 Pulse Generator	31	200.00
Model 1061 Linear Amplifier	31	165.00
Model S-100 Plug-In Decade	34	60.00
Model S-200 Plug-In Binary	34	60.00
TIMERS		
Model T1 Timer	32	108.50
Model T2 Timer	32	65.00
Model T100 Timer	32	55.00
Model SM60 Timer	32	70.00

RECORDERS AND REGISTERS	Catalog Page	Price
Model C-111 Printing Timer	14	$575.00
Model EC84 Register	32	45.00
Esterline-Angus Recorder	32	310.00*
Ametron Count Recorder	32	on request
SAMPLE HANDLING		
Model PM-1 Sample Spinner	33	45.00
Model PM-2	33	15.00
Model PM-3	33	7.50
Model N4 Sample Storage Cabinet	33	45.00
Model C-101 Absorbers	33	85.00
Model AF-12 Sample Pan	33	3.00/c
Model AC-12 Sample Pan	33	4.00/c
Model PC-12 Sample Pan	33	4.00/c
PROBES		
Model P2 Probe	34	30.00
Model P10 Probe	34	50.00
Model P11 Probe	34	40.00
Model 3033A Shielded Probe	34	55.00
Model 3033B Shielded Probe	34	75.00
CABLES		
Model PC2	34	8.00
Model PC3	34	12.00
Model PC4	34	12.00
Model PC5	34	12.00
Model PC6	34	5.00
Model PC7	34	8.00
Model PC8	34	8.00
Model PC9	34	10.50
Model PC23	34	8.00
Model PC24	34	$ 8.00
Model PC25	34	5.00
Model R4	35	20.00
REFERENCE SOURCES		
Model R2	35	5.00
Model R20	35	7.50
Model 6106	16	1.00
MISCELLANEOUS ACCESSORIES		
"Q"-Gas Cylinder	32	32.00
"Q"-Gas Refill	32	21.00
Model CA2 Scaler Cart	35	37.50
Model CA3 Scaler Cart	35	54.50
Model N3 Carrying Strap	35	5.00
Model N1 Nuclearule	36	5.00
Model N2 Warning Tape	36	6.00
Model N5A Warning Signs	36	2.00/pkg.
Model N5B Warning Stickers	36	2.00/pkg.
Model LN-5 Accessory Group	5	65.00
BATTERIES FOR PORTABLES		
Model BA-002	36	.75
Model BA-003	36	1.65
Model BA-005	36	2.50
Model BA-006	36	11.00
Model BA-010	36	.50
Model BA-011	36	65.00
Model BA-015	36	.60
Model BA-016	36	1.25
Model BA-021	36	.40
Model BA-022	36	.60

All prices are f.o.b. factory (Chicago). All prices subject to change without notice.

Packing—packed in cartons. Wood case packing, if required and specified in order, is charged extra at cost. *F.O.B., Indianapolis, Indiana.

For Nuclear-Chicago's complete list of Radiochemicals, see the current ChemRad Price Sheet

NUCLEAR INSTRUMENT AND CHEMICAL CORPORATION, 223 W. Erie Street, Chicago 10, Ill.

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CONTENTS

SELECTING THE RIGHT INSTRUMENT

The primary problem encountered in the selection of equipment for any radiolaboratory is that of predicting the work to be done and then choosing the pieces of equipment which will do that work best. When the counting work is of a routine nature and its purpose will continue to be the same, the solution is fairly easy, but in most research work a degree of flexibility is necessary and the selection of minimum equipment is usually not economical in the long run.

The problem of selecting the proper equipment must be approached by deciding four important questions:

1) What isotope or isotopes will be counted?
2) What amount of activity must be counted in each procedure?
3) Will there be a large or small number of samples to be counted per day?
4) Will the counting work be done by trained people or by relatively untrained technicians?

The answers to these questions will usually determine the type of detector and, also, the computing device to be used, but in some cases the nature of the work will be such that the detector will have to be chosen on the basis of the kind of sample most conveniently available.

An extreme example would be the choice between a sample counter for counting tracer amounts of material and a clinical type counter for gamma counting in vivo.

In order to assist both new users and scientists planning additional facilities, we have prepared the Guide to Instrument Selection shown on the following page. This Guide is divided first by types of radiation to be counted and then by the type of detector chosen. Suggestions are made as to the reasons for choosing specific detectors and specific scaling units, but this information is, of course, by no means complete. In considering any instrument, reference should be made to the appropriate catalog page offering a detailed description of this instrument. The greatest advantage will be gained from this catalog by using this Selection Guide in conjunction with the individual descriptive pages. Pages 4 and 5 also illustrate suggested instrument groups for equipping new laboratories.

Certain types of accessories do not appear in the Guide because they meet specific counting problems, yet are not characteristic of any type of radiation. The automatic sample changer and the "Actigraph" chromatographic analyzer are examples. Also, mounts and shields are not listed, but must be selected for geiger counters. Other regular needs are storage cabinets, sample pans, and warning cards or labels.

All descriptions in the catalog have been made as complete as is reasonably possible, and it is hoped the prospective buyer will be able to select his needs directly from these catalog pages. However, we welcome your inquiries and will be glad to be of additional assistance on any particular counting problem which may be encountered. At the back of this catalog will be found a list of the district offices of the company. Local representatives of this company will be glad to meet with you to help solve any particular instrumentation problem which may arise.

MONITORING INSTRUMENTS

HEALTH MONITORING	Page	alpha	beta	gamma	neutrons
Models 2050A Charger-Reader and 3341 Pocket Chamber	18		X	X	
Models 561 Charger and 541A Dosimeter	19		X	X	
Nuclear-Chicago Film Badges	19		X	X	
Model 1500 Hand and Foot Monitor	20		X	X	
Model 1310 Remote Monitron	17			X	X
Guarditron Alarm Circuit	17		X	X	
PORTABLE SURVEY INSTRUMENTS					
Model 2111 "Pee Wee" with AP1 or AP2 Detectors	23-27	X			
Model 2111 "Pee Wee" with DN-1 or DN-2 Detectors	23-27				X
Model 2611 (recommended for C-14, S-35)	21	X	X	X	
Model 2585 "Cutie Pie"	22		X	X	
Model 2610A	21		X	X	
COUNT RATE METERS					
Model 1615B with D33 Detector	16		X	X	
Model 1615B with D34 Detector	16	X	X	X	

GUIDE TO INSTRUMENT SELECTION

LABORATORY COUNTING SYSTEMS

DETECTORS	See page	SCALERS	See page

A. For counting **soft betas** (with energies less than 0.3 mev)-Carbon-14, Sulfur-35, Iron-59, etc.

GEIGER REGION

D34 Mica End Window Counter- For high activities at lowest cost	28	These geiger counters may be used with any Nuclear-Chicago scaler. We suggest:	
D46A "Q-Gas" Flow Counter- For low activities with high efficiency	26	Model 183 for automatic operation	9
		Model 166 for decade operation	12
		Model 161-basic	12
		Model 165-basic with built-in register	12
		Model 180-minimum cost and not over 7500 cpm	11

PROPORTIONAL REGION

D45 Methane Flow Counter- For high speed counting of solid samples	26	These proportional counters used for beta counting require a high gain linear amplifier, a relatively fast scaler, and a voltage in excess of 4,000 volts. We suggest:	
Bernstein-Ballentine Counters- For gaseous phase C-14 counting	36	Model 182X	8

B. For counting **hard betas** (with energies greater than 0.3 mev)-Phosphorus-32, Strontium-90, Chlorine-36, Gold-198 and 199, Iodine-131, etc.

GEIGER REGION

G-M Counters listed above		See suggestions above on scalers to be used with geiger counters
D33 Mica End window counter	28	
D12, D50, and D51 self-quenching G-M tubes.	29	
D52 self-quenching G-M tube (insulated for use as a dip counter)	29	
D76 self-quenching G-M tube (will detect betas 0.4 mev or greater)	29	

C. For counting **gamma** radiation-Cobalt-60, Iodine-131, Gold-198 and 199, Iron-59, Caesium-137, Potassium-42, Sodium-24, etc.

GEIGER REGION

G-M counters listed above		See suggestions above on scalers to be used with geiger counters
D22 self-quenching G-M tube	29	
Bismuth cathode tubes	28	

SCINTILLATION

DS-1 Scintillation Detector (with Model 3036 for sample counting)	27	Model DS-1 may be used with any Nuclear-Chicago scaler except Model 180. We suggest:	
		Model 183 for automatic counting	9
		Model 172 for automatic counting and greater versatility	10

D. For counting **alpha** particles-Uranium-238 series, Thorium-232 series, Actinium-231 series, and the Neptunium-239 series.

GEIGER REGION

D34 Mica-end Window Counter — for lowest cost with low efficiency	28	See suggestions above on scalers to be used with geiger counters
D46A "Q-Gas" Flow Counter — for good efficiency (also counts betas simultaneously)	26	

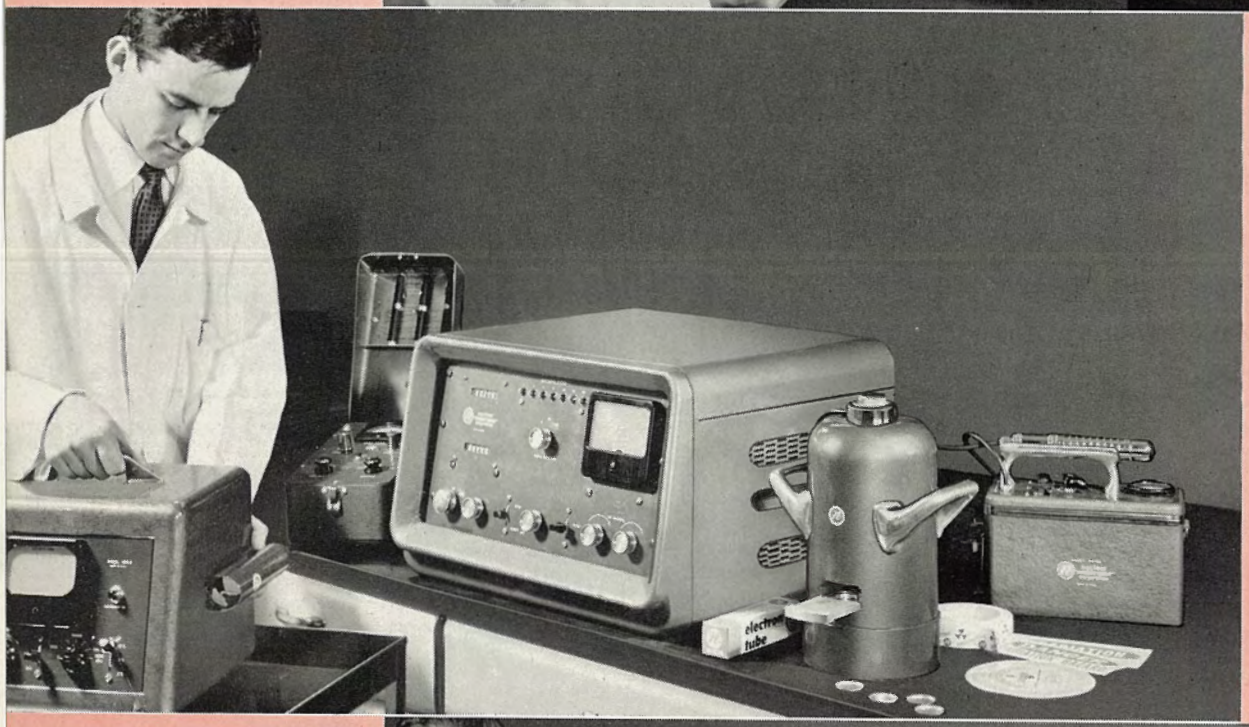
PROPORTIONAL REGION

D45 Methane Flow Counter — for alphas only in the presence of betas	26	These proportional detectors require a high gain linear amplifier and a relatively fast scaler. We suggest:	
AP1, AP2 Alpha Probes (for survey use only).	29	Model 182-Manual counting, electrical reset	8
		Model 172-For automatic counting	10
		Model 2111-Portable with AP1 or AP2	23

CLINICAL GAMMA COUNTING

DS-1 Scintillation detector	27	Model 1617 "Isotron" Mobile Count Rate Recorder	15
		Model CA4 "Carette" with any Nuclear-Chicago scaler except Model 180. We suggest:	15
		Model 183 for automatic counting	9
		Model 172 for automatic counting and greater versatility	10

1



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SUGGESTED INSTRUMENT GROUPS

CHECK LIST FOR ORDERING

- ☐ Instrument Group
- ☐ Accessory Group
- ☐ Auxiliary Equipment (Sample Changer, Sample Spinner, Storage Cabinet, Shield, Scaler Cart, Timer, etc.)
- ☐ Personnel Protective Devices (Pocket Chambers, Film Badges, etc.)

While the Guide on the preceding pages should be of considerable assistance in the selection of counting equipment, we have assembled several suggested instrument groups which may be ordered without specifying each instrument separately. We receive many requests for instrument lists, and trust these suggestions will be helpful.

1 One of the most common counting problems is that of measuring carbon-14 in solid samples. Because of the low energy of C-14 beta radiation (0.115 mev.), we recommend the use of a windowless flow gas counter (Model D46A) used with a G-M scaler. If few samples are to be counted, a scaler such as Model 165 will provide excellent results, but if many samples are to be counted, an automatic scaler like Model 183 with Model T1 Timer, shown at left, is well worth the extra cost in time saved. Model 2611 Survey meter, shown in the background, is recommended for use because of its very thin window (1.4 mg. per sq. cm.). Model N1 Nuclearule and warning labels are useful accessories.

To order Model 183, T1, D46A, and 2611 as a group at reduced cost, specify Carbon Laboratory No. 1. A different scaler may be specified if desired, at a suitable price change. We also recommend ordering Model LN-5 Accessory Group* with these instruments.

2 For general purpose laboratory work, involving medium and higher energy emitters, a mica end window counter (Model D33 or D34) is most useful mounted in Model 3031B Shield and Manual Sample Changer. In such a general purpose laboratory, Model 182 Scaler, as shown, is a good choice if proportional counting may be used. For a large number of samples, Model C-110 Automatic Sample Changer, with associated Models C-111 Printer and 3037 Shield, should be added.

Shown with these instruments is Model 2610A Beta Gamma Survey Meter and Model 1615B Analytical Rate Meter, excellent for semi-quantitative measurements, monitoring, and general use. Every lab needs one of these versatile instruments, as well as the Model CA3 Scaler Cart on which it is resting.

Also shown are the convenient Nuclearule and warning labels, as well as Model 3341-2050A personnel protective devices. The latter are important in any laboratory where medium or high energy radiation is present.

To order Models 182, 3031B, D34, 2610A, and 1615B as a group at reduced cost, specify General Laboratory No. 2. A different scaler may be specified if desired, at a suitable price change. We also recommend ordering Model LN-5 Accessory Group* and suitable personnel protective devices with these instruments.

3 This research laboratory group provides basic equipment for automatic counting of radiation ranging from low energy betas to penetrating gammas. Model D46A has approximately 100% sensitivity for betas, while gammas may be very efficiently counted with Model DS-1 Scintillation Counter in Model 3036 Lead Shield, shown at left. For beta and gamma radiation Model 2610A Monitor is a laboratory standard, while Model 2585 "Cutie Pie" is excellent for monitoring larger amounts of gammas. Since Model 172 is extremely versatile, either G-M or proportional counters could be used with it to count automatically. Model 1615B Analytical Rate Meter can be used to quickly assay radioactive samples, or can be modified to attach to the scaler to provide continuous count rate indication while the count is progressing.

When working with a range of energetic radiation it is important to provide Model 3341-2050A personnel protection (see page 18). These instruments are shown on the scaler cart.

To order Models 172, 1615B, D46A, DS-1, 3036, 2610A, and 2585 as a group at reduced cost, specify Research Laboratory No. 3. We also recommend ordering Model LN-5 Accessory Group* and suitable personnel protective devices with these instruments.

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*Model LN-5 Accessory Group consists of the accessory items usually overlooked when ordering major items of equipment: Model N1 Nuclearule, N2 Warning Tape, N5 Radiation Hazard Signs, R2 Radium Checking Source, and N4 Sample Storage Cabinet.

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ChemRad RADIOCHEMICALS

OFFER NEW TOOLS FOR RESEARCH

The availability of a large number of "ChemRad" radiolabeled chemicals and compounds offers the investigator new and unique tools for measurements, for tracer experimentation, and for process control. Typical uses of "ChemRad" radiochemicals include 1) metabolic and tracer studies for the detection or determination of chemical or biological reactions, 2) analytical measurements by the use of dilution ratio determinations and other techniques, 3) quality control by the use of measurement, tracer, or detection techniques, 4) process indication by simple labeling, and 5) study and improvement of chemical reactions by the use of tracer techniques.

Nuclear-Chicago's list of "ChemRad" chemicals, shown on the following page, consists entirely of carbon labeled compounds available from stock or on short delivery. However, additional compounds are constantly being added to this list, and labeling with other isotopes can also be provided on request.

Our list of carbon compounds combines those available from our own Radiochemical Laboratory with a large number of compounds produced by Great Britain's Radiochemical Centre, the primary organization of that government for processing compounds. Nuclear-Chicago acts as exclusive United States agent for British labeled compounds, and therefore is able to offer you the unique combination of two progressive radiochemical laboratories, with extremely flexible facilities, to solve any radiochemical problem you may have. Write the Nuclear-Chicago home office or inquire of your local district office for suggestions on the solution of any radiochemical problem.

Nuclear-Chicago's "ChemRad" radiochemicals are available under relatively simple procedures stated below. Certain packages of these chemicals are offered entirely free from AEC approval if used within the United States. Others are subject to approvals which can be obtained through a routine application to the USAEC. Any Nuclear-Chicago office will be glad to help you obtain all necessary approvals.

Packaging — Crystalline compounds are packaged in screw-top vials or sealed ampoules. The liquid or gaseous materials (designated in the list by an asterisk) are packaged in tubes with break-off seals.*

How to Order Radiochemicals

1. Certain compounds of isotopes with a half-life greater *than* 30 days are offered in license-exempt packages containing slightly less than one microcurie of activity. These packages may be purchased within the United States without application to the United States Atomic Energy Commission.

2. For other than license-exempt amounts, application for Radioisotope Procurement (Form AEC-313) is submitted in triplicate to the Isotopes Division, Atomic Energy Commission, Oak Ridge, Tennessee. On the return of the approved form, send one copy with your order to Nuclear-Chicago. We will be glad to help you prepare Form AEC-313.

3. If the radioactive material, regardless of amount of activity, is to be injected or otherwise consumed by either humans or animals, your order must include one completed copy of Certificate of Compliance with Federal Food, Drug and Cosmetic Act (Form AEC-465).

4. If your use of the radioactive material DOES NOT require consumption by humans or animals, please *so state on your order,* and disregard item number 3.

Copies of Forms AEC-313, and AEC-465 are available at all Nuclear-Chicago offices and from the U. S. Atomic Energy Commission, Isotopes Branch, Oak Ridge, Tennessee.

LIST OF RADIOCHEMICALS

Number	Compound	Spec. Act. (millicuries/ millimole)	Package Size (millicuries) 1	0.5	0.1	.02
INORGANIC COMPOUNDS						
CFA 2	Sodium carbonate-C^{14}	1-4	X		X	
CFA 3	Sodium bicarbonate-C^{14}	1-4	X		X	
CFA 4	Barium carbide-C^{14}	2-8	X			
CFA 5	Potassium cyanide-C^{14}	1-2	X			
CFA 6	Carbon monoxide-C^{14}	1-4	X			
CFX 1	Carbon black-C^{14}		X	X	X	
ALCOHOLS AND DERIVATIVES						
CFA 7	Methyl alcohol-C^{14}*	1-4	X			
CFA 8	Methyl iodide-C^{14}*	1-4	X			
CFA 9	Isopropyl alcohol-1,3-C^{14}*	1	X	X		
CFA 10	Isopropyl iodide-1,3-C^{14}*	1	X	X		
CFA 44	Ethanol-1-C^{14}*	1-4	X	X		
CFA 46	Ethyl iodide-1-C^{14}*	1-4	X	X		
CFA 47	Glycerol-1,3-C^{14}*	1	X	X	X	
ACIDS AND DERIVATIVES						
CFA 11	Sodium formate-C^{14}	1-2	X			
CFA 12	Lead formate-C^{14}	1-2	X			
CFA 13	Sodium actetate-1-C^{14}	1-4	X		X	
CFA 14	Sodium acetate-2-C^{14}	1-4	X		X	
CFA 48	Sodium propionate-1-C^{14}	1	X		X	
CFA 15	Sodium butyrate-1-C^{14}	1-4	X		X	
CFA 16	Acetonitrile-2-C^{14}*	1-4	X	X		
CFA 17	Bromoacetic acid-1-C^{14}*	1	X	X		
CFA 18	Bromoacetic acid-2-C^{14}*	1	X	X		
CFA 19	Sodium cyanoacetate-2-C^{14}	1	X	X		
CFA 20	Methyl cyanoacetate-2-C^{14}*	1	X	X		
CFA 21	Diethyl malonate-2-C^{14}*	1	X	X		
CFA 22	Diethyl malonate-1,3-C^{14}*	1	X	X		
CFA 23	Palmitic acid-1-C^{14}	.1-.5	X			
CFA 24	Stearic acid-1-C^{14}	.1-.5	X		X	
CFA 25	Stearic acid-2-C^{14}	.1	X	X	X	
CFA 26	Benzoic acid-*carboxyl*-C^{14}	1-4	X		X	
CFA 27	2,4D-2-C^{14}	1	X	X		
CFA 28	2,4D-1-C^{14}	1	X	X		
CFA 29	3-p-methoxyphenyl-n-butyric acid-1-C^{14}	2-3	X	X		
AMINO ACID						
CFA 30	Glycine-1-C^{14}	1	X	X	X	
CFA 31	Glycine-2-C^{14}	1-4	X	X	X	
CFA 32	Hippuric acid-1-C^{14}	1	X	X		
CFA 33	Hippuric acid-2-C^{14}	1	X	X		
CFA 35	DL-3-Phenylalanine-2-C^{14}	.5-1	X	X	X	
CFA 45	DL-Glutamic acid-1-C^{14}	1-4	X	X	X	
RING LABELED COMPOUNDS						
CFA 36	Naphthalene-1-C^{14}	2-3	X	X	X	
CFA 37	1-Naphthol-8-C^{14}	2-3	X	X	X	
CFA 38	2-Naphthol-8-C^{14}	2-3	X	X	X	
CFA 39	2-Naphthylamine-8-C^{14}	2-3	X	X	X	
MISCELLANEOUS COMPOUNDS						
CFA 40	Acetylene-C^{14}*	2-8	X			
CFA 41	Urea-C^{14}	1-2	X		X	
CFA 42	Acetone-1,3-C^{14}*	1	X	X		
CFA 43	Acetone-2-C^{14}*	1	X	X		
CARBOHYDRATES AND DERIVATIVES, UNIFORMLY LABELED						
CFB 1	Starch-C^{14} (tobacco)		X	X	X	
CFB 2	d-Glucose-C^{14}	approx. 0.5	X	X	X	X
CFB 3	d-Fructose-C^{14}	microcuries/mg.	X	X	X	X
CFB 4	Sucrose-C^{14}		X	X	X	
CFX 3	Fructose-1,6 diphosphate-C^{14}	0.13 microcuries /mg.		20 microcuries and 5 microcuries		
PLANT						
CFX 6	Dried Algae (chlorella pyrenoidosa-C^{14})	2 microcuries/mg			X	
PLASTICS						
CFP 1	Polymethyl methacrylate-C^{14}	0.1 microcuries/gm		3 cm^2 x 1 mm.		
CFP 2	Polymethyl methacrylate-C^{14}	1.0 microcuries/gm		3 cm^2 x 1 mm.		
CFP 3	Polymethyl methacrylate-C^{14}	10 microcuries/gm		3 cm^2 x 1 mm.		

SPECIAL LICENSE EXEMPT PACKAGE

Nuclear-Chicago's 40 mg. packages of radiosugars have activities of approximately 50,000 disintegrations per minute per mg. No AEC authorization is required, but only one package can be shipped per order.

*Supplied in break-off seal ampoules.

SCALING UNITS

MODEL 182

Ampli-Count Scaler

Model 182 "Ampli-Count" Scaler is designed for use where wide sensitivity range is important and automatic operation is not required by the necessity to count a large number of samples. The sensitivity range provides linear amplification for pulses from 1 millivolt to 1 volt, permitting it to handle geiger, scintillation, or proportional counting. It is a fast scaler with a resolution time of 2 microseconds and an amplifier circuit having a rise time of less than 0.2 microseconds. The wide range amplifier is non-overloading and has a large dynamic range to eliminate d. c. level shift. It is an excellent scaler for gaseous phase C^{14} counting (Bernstein-Ballentine method — see page 36), or any other technique requiring a fast scaler with good amplifier characteristics.

Both a register and drum type timer are built into Model 182, and a single button reset provides automatic electric reset of interpolation lights, register, and timer. An external timer (Model T1) can be utilized to provide automatic time operation if desired. The well stabilized high voltage supply provides 500 to 2500 volts. On request, 500 to 5,000 volts can be provided at slight additional cost, by specifying Model 182X. (A modification kit is also available for changing the voltage range in an existing scaler at a later date). Operational status of the instrument is shown at all times by an illuminated indicating panel.

Specifications

Range — Higinbotham scale of 256, with scale selection of 4, 8, 16, 32, 64, 128, and 256, and six digit register.

Resolving time — Two microseconds. Up to 300,000 cpm result in less than 1% coincidence loss.

Sensitivity — 1 mv to 1 volt, with 0.1-1.0 volt setting for G-M pulses. XI, X10, and X100 attenuation switch, with a calibrated continuously variable discrimination control.

Amplifier — Shock mounted input circuit, with amplifier rise time less than 0.2 microsecond, overshoot less than 10%, and dynamic range of 1200.

High voltage — 500 to 2500 volts, with coarse and fine controls, mounted on "Bolt-on" chassis. (5000 volts optional). Four inch meter. Sealed transformer for reliability. Less than .002% change for 1% line voltage change between 95 and 130 volts. Rectifier tubes submounted. Uses "flutter-free" 5651 tube for reference voltage.

Timer — Indicates elapsed time in minutes and hundredths to 9999.99.

Reset — One switch electrically resets interpolation lights, register, and timer. (Available without timer and with manual reset as Model 182A).

Operation Control — One switch provides OFF, ON (not high voltage), 60 CYCLE TEST (input and scaling stages), STAND-BY (high voltage filaments and 60-cycle pulsing), and HV (at value set by high voltage controls) indicated on illuminated panel. Separate STOP-COUNT switch.

Connectors — Input, auxiliary, preamplifier, high voltage, oscilloscope connectors on rear of chassis.

Mounting — Chassis and panel slope-mounted in well ventilated cabinet, may be rack mounted if desired. Recessed handles on side facilitate moving.

Power — 200 watts, 95-130 or 190-260 volts, 50-60 cycles.

Weight — 89 lbs., shipping weight 100 lbs.

Supplied with high voltage cable and instruction manual.

ONE YEAR WARRANTY

MODEL

183

Count-o-matic Scaler

Specifications

Range — Higinbotham scale of 256, with scale selection of 4, 8, 16, 32, 64, 128, and 256, and four digit register.
Resolving time — Two microseconds. Up to 300,000 cpm result in less than 1% coincidence loss.
Sensitivity — Factory set at 0.25 volt (30 mv. available).
Count-o-Matic control — Counts 10, 100, or 1000 times any scaling factor, or any predetermined time up to 60 minutes with Model T1 Dual Timer.
High voltage — 500 to 2500 volts, with coarse and fine controls, mounted on "Bolt-on" chassis. Four inch meter. Sealed transformer for reliability. Less than .002% change for 1% line voltage change between 95 and 130 volts. Rectifier tubes submounted. Uses "flutter-free" 5651 tube as reference voltage.
Timer — Indicates elapsed time in minutes and hundredths to 9999.99.
Reset — One switch electrically resets interpolation lights, register, and timer. (Available without timer and with manual reset as Model 183A).
Operation Control — One switch provides OFF, ON (not high voltage), 60 CYCLE TEST (input and scaling stages), STAND-BY (high voltage filaments and 60-cycle pulsing), and HV (at value set by high voltage controls) indicated on illuminated panel. Separate STOP-COUNT switch.
Connectors — Input, auxiliary, preamplifier, high voltage, oscilloscope connectors on rear of chassis.
Mounting — Chassis and panel slope-mounted in well ventilated cabinet, may be rack mounted if desired. Recessed handles on side facilitate moving.
Power — 200 watts, 95-130 or 190-260 volts, 50-60 cycles.
Dimensions — 12¼" x 20" x 20".
Weight — 87 lbs., shipping weight 98 lbs.
Supplied with high voltage cable and instruction manual.

Model 183 "Count-o-Matic" is an automatic G-M scaler for use on all geiger counters and on scintillation counters having an output pulse of ¼ volt or greater. It is ideal for counting a large number of samples routinely, and is excellent for operation with Model C-110 Automatic Sample Changer. (See page 14). It may be used to connect directly with Model DS-1 Scintillation Counter (page 27), and should be chosen wherever automatic counting is advantageous.

The exclusive "Count-o-Matic" controls allow operation for a predetermined numbers of counts or a predetermined length of time. A Higinbotham scale of 256 permits counting samples of high activity, and scale selection of 4, 8, 16, 32, 64, 128 and 256, coupled with a "Count-o-Matic" operation switch of 10, 100, or 1,000 times the scaling factor, permits a wide flexibility of preset count settings. An additional switch position permits predetermined time counting with an external Model T1 Timer (page 32).

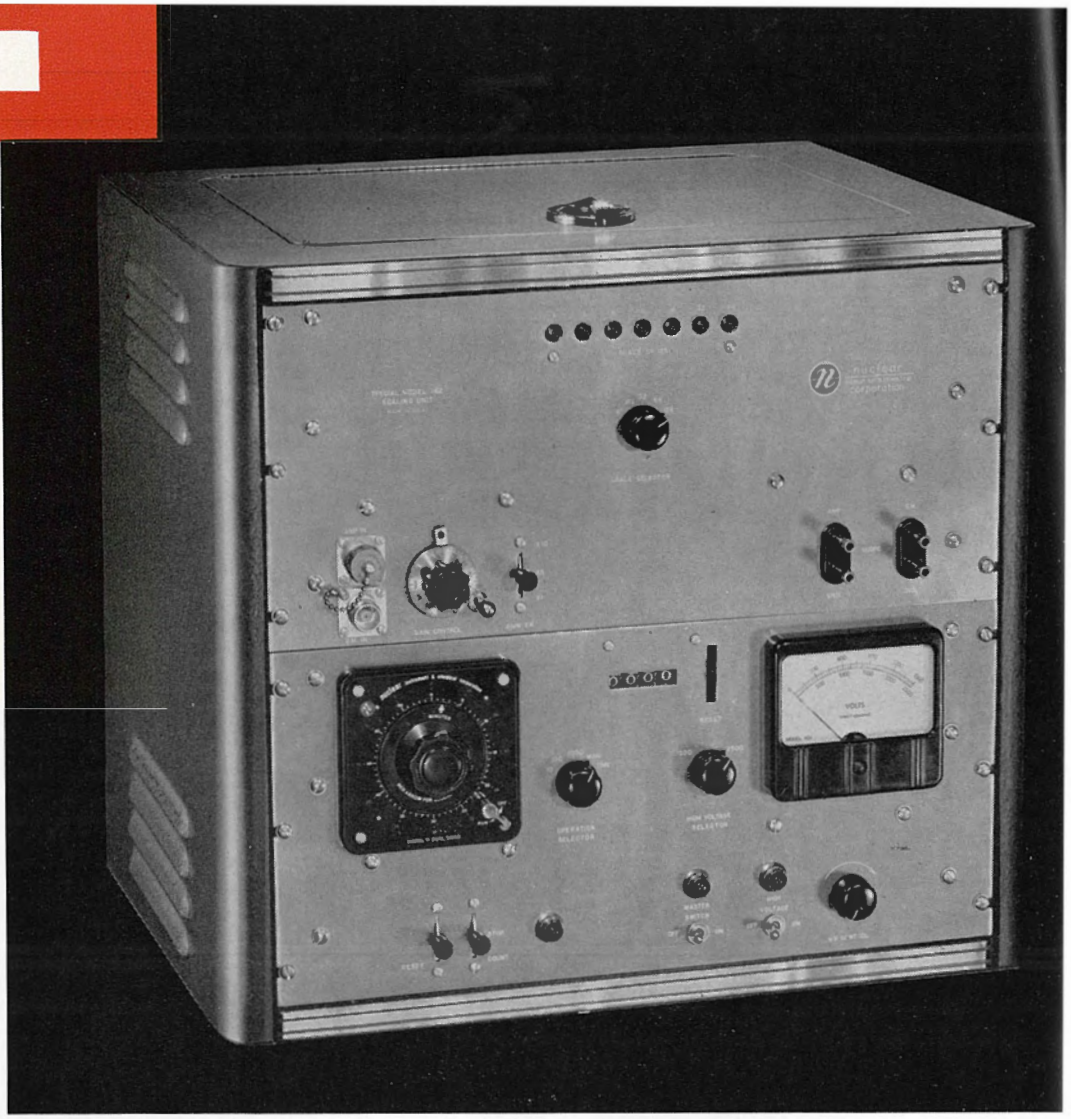
The high voltage range is 500-2500 volts, with Coarse and Fine controls. A built in timer provides elapsed time indication, and a single switch operates electrical reset of register, timer, and interpolation lights. This scaler is also available without timer and with manual reset as Model 183A.

ONE YEAR WARRANTY

SCALING UNITS

MODEL 172

Ultrascaler



Model 172 "Ultrascaler" is our most versatile scaler, because it provides a choice of (1) manual or automatic counting, (2) either predetermined time or predetermined count operation, (3) input for G-M pulses or linear amplification of millivolt pulses for proportional counting, and (4) built in dual timer to allow complete operation without any accessory except the detector. The "Ultrascaler" is an excellent instrument where the work program cannot easily be predicted, as it permits the use of any type of detector with a voltage requirement up to 2500 volts, and voltages up to 5,000 volts can be utilized by the use of Model 1090A High Voltage Supply. (See page 31). It is recommended as part of Research Laboratory No. 3 (see page 5) because of its great adaptability.

Scaling factors are provided in steps up to 128, and a wide range of predetermined counts can be selected up to 128,000 counts, in fifteen steps. The dual high voltage supply is well stabilized and offers 500 to 1500 volts or 2500 volts. Resolution time is 1 microsecond, making the instrument capable of accepting very high counting rates. Oscilloscope connections are provided on both G-M and AMP inputs.

Specifications

Range — Higinbotham scale of 128, with scale selection of 8, 16, 32, 64, and 128.
Resolving time — One microsecond. Maximum scaler counting rate for 0.5% coincidence loss is 150,000 cpm.
Sensitivity — 0.25 volt at G-M input, 1 millivolt at AMP input, with X1, X5, and X10 attenuation switch and continuously variable discrimination control.
Amplifier — Rise time 0.2 microsecond.
Count-o-Matic control — Counts 10, 100, or 1000 times any scaling factor, or any predetermined time up to 60 minutes with built-in timer.
High voltage — 500 to 1500 or 2500 volts, with range selection. Sealed transformer for reliability. Less than .01% change for line voltage change between 95 and 130 volts.
Timer — Built-in dual timer for elapsed time or predetermined time up to one hour.
Operation control — Choice of manual, predetermined count, or predetermined time operation. Separate stop-count and reset switches. Separate master and high voltage switches with pilot light indicators. High voltage switch operates through 30 second time delay.
Connectors — G-M and AMP inputs, G-M and AMP oscilloscope terminals on front panel. Quench and high voltage connections on rear.
Mounting — Two removable chassis in ventilated metal cabinet, may be rack-mounted if desired.
Power — 165 watts, 95 to 130 volts, 50-60 cycle.
Weight — 82 lbs., shipping weight 100 lbs.
Supplied with two high voltage cables, jumper cable, and instruction manual.

ONE YEAR WARRANTY

MODEL

180

Rediscaler

Specifications

Range — Scale of 10, with fast register that permits counting to 6500 cpm with 2% loss.

Register — Non-resettable register counts to 99999.

Sensitivity — Factory set at 0.25 volt.

Decade — Utilizes Dekatron glow decade tube.

High voltage — Stabilized high voltage in four steps at 900, 950, 1000, and 1050 volts. Other ranges available starting at 700 up to 2000 volts by changing voltage regulator tube. High voltage meter not provided.

High voltage indication is provided on the control switch as V+0, V+50, V+100, and V+150, where V is the voltage of the regulator tube in the "Rediscaler."

Reset — Switch resets glow decade to "O" if desired.

Connectors — Input and timer connections on rear. Removing 2x2 plate cap removes high voltage at input, permitting use of Model 180 as high speed register.

Monitoring — Chassis and panel slope-mounted in small metal cabinet. Handle provided on top.

Power — 55 watts, 105 to 130 volts, 60 cycles.

Weight — 21 lbs., shipping weight 27 lbs.

Supplied with high voltage cable and instruction manual.

Suggested Accessories

Model M2 Mount and Model T-100 timer, shown above with Model 180, are suggested to provide a complete counting group. Also order either Model D33 or D34 detector (page 28).

Model 180 "Rediscaler" is the "handyman" of the radio-laboratory. It incorporates only the essential features of a G-M scaling unit — providing count indication and a well stabilized high voltage supply — yet it is as reliable and accurate as a more expensive instrument. The "Rediscaler" is specifically designed for tracer counting, and is recommended for counting rates less than 7500 counts per minute. The high voltage supply is variable in four 50-volt steps to suit the detector used. It is normally supplied with a 900 volt regulator tube, but other voltage ranges are also available.

Because of its low cost, light weight, and portability, the "Rediscaler" can be moved around between laboratories or counting locations as a standby unit, or for other counting purposes where technical versatility is not needed.

The "Rediscaler" features a Dekatron glow transfer tube for decade indication of counts received. Its low cost makes it the answer to many budget problems, and its decade indication and simplicity of operation make it ideal for teaching purposes. It can be operated easily by students with a minimum of training.

SCALING UNITS

Model 161 Scaler is our basic scaler with greatest flexibility. It is widely used because of its scale selection and high voltage supply in a lower priced scaler. The Model 161 has a reliable diode-coupled Higinbotham scale of 256 for fast counting, and a switch permitting scale selection of 4, 8, 16, 32, 64, 128, or 256. Provision is made for attaching an external register. Built-in electronically regulated high voltage supply provides up to 2500 volts. An external timer is controlled with the stop-count switch.

Specifications

Range — Higinbotham scale of 256, with scale selection of 4, 8, 16, 32, 64, 128, and 256.
High Voltage Range — 600 to 2500 volts.
Common Characteristics — See below*.
Power — 165 watts, 95 to 130 volts, 50-60 cycles.
Weight — 68 lbs., shipping weight 73 lbs.

Model 165 Scaler is a popular basic scaler designed for easy operation by inexperienced personnel. It may be used in medical applications, in radiochemistry laboratories, for instruction and for monitoring purposes. Requires only a Geiger or scintillation counter and a timer for operation wherever a basic scaling circuit is needed, since the register is built in. A complete basic group would be Model 165 with Model M2 mount, Model D34 mica end window counter and Model T100 timer.

The G-M input is factory set at 0.25 volt sensitivity, and the high voltage supply is continuously variable from 600 to 1500 volts. An external timer outlet, controlled by the stop-count switch, provides automatic timer shut-off when counting is stopped.

Specifications

Range — Higinbotham scale of 64.
Register — Six digit resettable register.
High Voltage Range — 600 to 1500 volts.
Common Characteristics — See below*.
Power — 135 watts, 95 to 130 volts, 50-60 cycles.
Weight — 68 lbs., shipping weight 73 lbs.

Model 166 Decade Scaler is a manual unit designed for those who prefer the simplicity of reading a decade-type unit. Ideal for use in clinical applications and laboratories where speed of reading and recording simplifies record keeping. Model 166 embodies a patented Nuclear-Chicago decade circuit with a ring of five bistable tubes, followed by a scale of two. Computer-type tubes are used for greatest reliability. A series of neons gives direct decimal indication.

Operation of the Model 166 is simple. The electronically-stabilized high voltage supply is controlled from the front panel, and a stop-count switch controls the counting and timer connection. An electric timer such as Model T100 can be plugged into a convenient connector on the rear.

Specifications

Range — Scale of 100, using ring of five and scale of two.
Register — Six digit resettable register.
High Voltage Range — 600 to 2500 volts.
Power — 130 watts, 95 to 130 volts, 50-60 cycles.
Weight — 68 lbs., shipping weight 73 lbs.

***Common Characteristics:**
Resolution time — Five microseconds.
Sensitivity — Factory set at 0.25 volt.
High Voltage Stabilization — Less than 0.01% change for 1% change in line voltage between 95 and 130 volts.
Reset — Manual. Separate stop-count switch.
Mounting — Slope-mounted in well ventilated cabinet with recessed handles to facilitate moving. Chassis may be rack mounted if desired.
Dimensions — 12¼" x 20" x 20".
Supplied with high voltage cable and instruction manual.

ODEL

61

: Scaler

MODEL

165

Basic Scaler

ODEL

66

'e Scaler

COUNTING SYSTEMS

MODEL C-110 *Sample Changer*

Model C-110 Rotomatic Sample Changer is a compact unit used with Model 3037 Shield, Model C-111 Printing Timer, and a scaler to provide automatic sample counting. Since it incorporates its own Count Selector it may be used with any Nuclear-Chicago scaler except Model 180, for counting up to 50 samples at one loading. Model 183 scaler is recommended, since it may be set to change the sample if a maximum preset time has elapsed, even if the preset count has not been reached.

Heart of the Rotomatic Changer is the simple three-position "Auto-Load" turntable which simultaneously elevates a sample into counting position within the shield, selects the next sample, and places the previously counted sample in the storage magazine. Only one rotary motion is required, making the Rotomatic reliable and trouble-free.

Fifty numbered sample carriers are provided which load into one of the clear plastic magazines. The Rotomatic may be set to count all samples, with or without final background count, or to repeat the complete count as desired. The printer stamps the elapsed time on a paper tape, together with the number of the sample. Sample identification is easily maintained by using the numbered sample carriers in conjunction with the numbered Adapto-cups in Model N4 Sample Storage Cabinet (page 33).

Model 3037 Shield is similar to Model 3031B (page 30) except that it has no sample positions and its height is less.

Specifications

MODEL C-110

Capacity — Fifty numbered plastic carriers for counting up to fifty 1¼" x ⅛" samples.
Cycle time — Fifteen seconds per change with chrome-plated "Auto-load" turntable.
Operation Selector — Selects complete cycle and stop, continuous cycling in proper order, or count with background. Separate OFF-ON. START switch interrupts or starts operation after automatic stop.
Count Selector — Presets 5, 10, 20, 40, 80, or 100 times scaling factor, and provides switch positions for preset time or scaler controlled operation.
Connectors — Nine-pin to scaler, nine-pin to Printing-Timer. Separate line input also provided.
Power — 100 to 130 volts, 60 cycles (50 cycles on request).
Dimensions — 14½" x 15" x 18½" high.
Weight — 35 lbs., shipping weight 40 lbs.

MODEL C-111

Capacity — 99 samples to 99.99 minutes each.
Accuracy — Prints time within .01 minute.
Record — Prints time in minutes and hundredths with sample number on paper tape.
Power — 50 millisecond signal pulse and 115 volt, 60 cycle, power from Model C-110.
Connector — 9-pin cable from Model C-110.
Dimensions — 9¼" x 14" x 12".
Weight — 29 lbs., shipping weight 31 lbs.

MODEL 3037

Shielding — Approximately 2" of lead.
Connector — Four-pin socket for end-window counters, with knurled knob for vertically positioning G-M tube.
Dimensions — 6" diameter by 9" high.
Weight — 60 lbs., shipping weight 75 lbs.

ORDER ALL THREE FOR COMPLETE SYSTEM.

ONE YEAR WARRANTY

MODEL 1617 "Isotron"

Nuclear-Chicago's exclusive "Isotron", Model 1617, is a mobile console-type unit designed for clinical measurement of radioactivity in diagnostic or therapeutic applications. It consists of a precision count rate circuit of unusual flexibility with a well stabilized high voltage supply, a chart-type recorder to provide a permanent record of the counts, a gamma sensitive probe, and a counter-poised arm for positioning the probe easily around a patient's head or body. This equipment is housed in an attractive, compact cabinet which conserves valuable floor space and makes operation of the instrument easy and convenient. The top panel of the unit provides a large, easily read voltage and count rate meter and operating controls grouped for visibility and ease of operation. May be used with Model DS-1 scintillation counter, bismuth cathode, or mica window G-M counters.

Specifications

Range — Rate circuit has five ranges to 50,000 cpm. Choice of 2, 5, or 15% statistical accuracy on each range.
Integrating circuit — Factory-set sensitivity ¼ volt. Fast charge circuit permits quick time constant changes. Internal calibrating circuit.
High voltage — Continuously variable 650 — 1500 volts, indicated on 4" meter. Stabilized to less than .01% change per 1% change in input line voltage between 95 and 130 volts. Built-in Sola constant voltage transformer.
Recorder — Esterline-Angus recorder built into cabinet.
Controls — Major operating controls on top slant panel; speaker volume, voltage adjustment, calibration, zero set controls recessed on rear of cabinet.
Arm — Extends to 44" maximum, carries any detector up to 23 lbs.
Clamp — Toggle action clamp provides universal motion for detector. Holds Model DS-1 detector (3" in diameter) or smaller detector or shield with suitable adapter.
Cabinet — 37" high with slant top, chromium handle, storage space in base with interior light, cord reel for 9' line cord, 6" rubber-tired wheels, and locking brakes operated by side handles.

MODEL CA-4 "Carette"

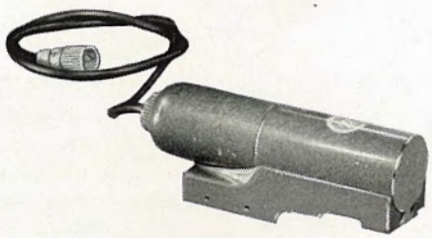
Model CA4 "Carette" consists of a heavy stainless steel hospital cart with four inch ball bearing, rubber tired casters and three deep shelves, carrying a flexible counterpoised arm which allows easy positioning of a detector around a patient's head or body. It is designed to carry a radiation detector, together with the necessary scaling instrument, rate meter, recorder, or any other equipment required to make clinical radiation measurements. It permits the use of instruments which may be removed for other applications, and requires adequate weight to balance heavy detectors. For specifications of associated equipment, see individual catalog pages.

The arm and clamp on the Carette are the same as shown on the Isotron (above). It is recommended that the arm be used off the end, rather than the side, of the Carette for greatest stability.

Dimensions — 18" x 27" x 32" plus arm.
Shipping weight — 75 lbs.

ONE YEAR WARRANTY

COUNTING SYSTEMS



MODEL 1615-B *Rate Meter*

Model 1615B Analytical Rate Meter is a precision integrating instrument to provide quantitative measurement of radioactivity for such purposes as medical diagnosis, tracer study, process control, isotope decay measurement, radiation level alarm, air or surface contamination, monitoring, etc. Five ranges up to 50,000 cpm, with choice of time constants to give 2, 5, or 15% statistical accuracy on any range.

Model 1615B incorporates a well stabilized high voltage supply to permit use of Model DS-1 Scintillation Counter (page 27) or other detectors. Ordinarily supplied with Model P11 probe and Model D34 mica window counter (page 28) at "package" price. Model P11 is Nuclear's exclusive magnetic probe with three foot cable for mounting on any ferromagnetic surface. For clinical use Model P10 is similar probe on ten foot cable with preamplifier (page 34). Connection provided for controlling Esterline-Angus or similar recorder with switch on front panel. Built-in controllable speaker provides constant audible indication.

Specifications

Range — Five ranges, 500, 1500, 5000, 15,000, and 50,000 cpm full scale, with choice of 2, 5, or 15% statistical accuracy on each range.

Sensitivity — Factory set at ½ volt.

Controls — Range switch selects range, also "line-locked" calibration and zero set positions. Three position switch selects statistical accuracy by time constant change. High voltage control, OFF-ON switch, and CRM-HV switch for meter also provided. Speaker volume, calibration, and zero set adjustments on rear.
Recorder OFF-ON switch on panel.
Pilot lights indicate instrument on and recorder on.

High voltage — Continuously variable 650 to 1500 volts, with 4" meter. Less than .01% change for 1% line voltage change between 95 and 130 volts.

Connectors — Input, six-pin preamplifier, HV out, and recorder connector on rear. For use with scaler specify model.

Power — 60 watts, 95 to 130 volts, 50 — 60 cycles.

Dimensions — 13½" x 11" x 9½".

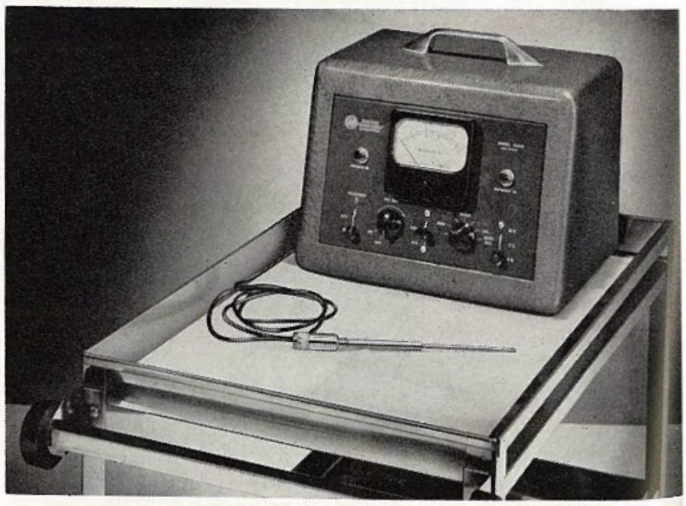
Weight — 27 lbs., shipping weight 33 lbs.

Supplied with instruction manual, also probe and detector as specified.

MEDICAL COUNTERS

Model 1615B Analytical Rate Meter is excellent as a semi-portable instrument for use with medical detectors such as Model 155 Probing Geiger Counter. This probe counter, only 3 mm. in diameter with a sensitive section 9/16" long at the tip, is designed for brain tumor detection using phosphorus-32 or sodium-24.

Model 222 small mica window detector for localizing eye tumors also operates into Model 1615B. Both Model 155 and 222 use a halogen-quenched counting gas for infinite counting life and large pulses. No preamplifier is required. They must be attached to Model 1615B with type 6106 connector and cable, and a voltage change must be made in Model 1615B. Write for details on medical counters.



ONE YEAR WARRANTY

NINETY DAY WARRANTY

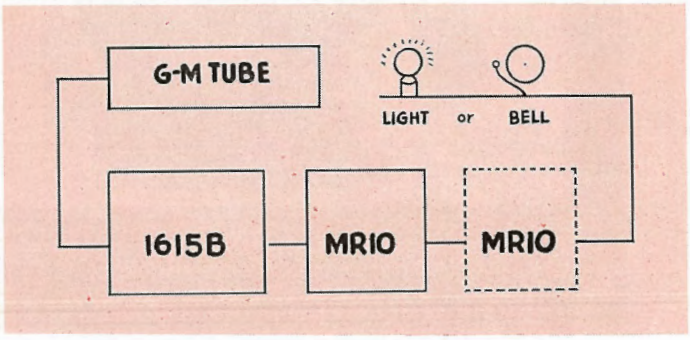
MONITORS

MODEL MR-10 *Alarm Circuit*

Model MR-10 Alarm Circuit is essentially an electronic relay to energize any convenient 110 volt signal. It operates from the output of Model 1615B and incorporates a contact type meter which may be set for a predetermined warning level. Can be used with bell, buzzer, howler, or light alarm. Alarm remains energized until manually reset.

Specifications

Meter — Contact type, calibrated 0-5 and 0-1.5.
Controls — Meter contact adjustment, off-on, and alarm reset.
Connectors — Signal input, power input, and alarm output on rear.
Dimensions — 8" x 8" x 8".
Weight — 5 lbs., shipping weight 7 lbs.



GUARDITRON MONITORING SYSTEM

The Guarditron system is excellent for protection or to warn against any sudden large background changes during sample counting. It utilizes Models 1615B and MR-10 to monitor low levels of gamma flux. It will reliably indicate an increase of 10% above normal background, using a 2" x 24" (Model 80) geiger counter for detection. Either manual or automatic reset can be provided. "Fail-Safe" operation is available by using an additional Model MR-10 circuit to gain low level control.

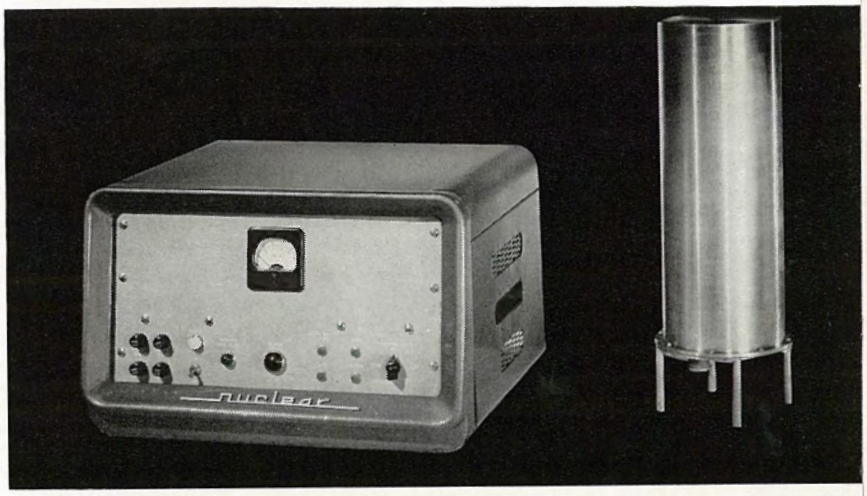
MODEL 1310 *Remote Monitron*

Nuclear's model 1310 Monitron is an area monitor developed at Oak Ridge National Laboratory for detecting and controlling or warning of relatively high levels of gamma or neutron activity. Its drift-free design is based on an extremely stable vibrating reed electrometer circuit. A built-in "fail-safe" alarm system may be preset for indication and automatic alarm of high and low radiation levels.

The detector is a 4000 cc ion chamber with built-in preamplifier for remote operation. It is supplied as standard with a 50 foot cable. The chamber is coated with carbon film, but may be ordered with a boron coating for slow neutron detection.

Specifications

Range — 125 mr/hr and 25 mr/hr full scale with "Radiation Level" switch in "High" and "Low" positions respectively.
Indication — Panel meter for continuous monitoring of radiation level. Connection provided for driving external 10 millivolt or 1 milliampere recorder.
"Alarm" light indicates any preset meter reading and is actuated upon failure of the instrument. Provision for operation of external alarm system simultaneously with the functioning of the "Alarm" panel light.
Linearity — ±2%.
Chamber — Built-in preamplier with connection on bottom. Polished aluminum finish. Overall dimensions — 6½" diameter x 17".
Power — 90 watts, 100 to 130 volts, 60 cycles.
Weight — 85 lbs., shipping weight 100 lbs.
Supplied with 50 foot cable and instruction manual.



ONE YEAR WARRANTY

PERSONNEL PROTECTION

In any laboratory where appreciable amounts of radioactivity or x radiation are used, it is important to provide an adequate health physics program. Besides survey equipment such as that shown on pages 21-23, pocket ionization chambers should be provided for all personnel where gamma, x, or hard beta radiation may be present.

For laboratories where four or more chambers are worn, or where it is not felt desirable for technicians to check their own dosages, Model 3341 indirect reading chambers with Model 2050A are recommended and are less expensive.

Where only two or three chambers are worn, the Model 541A Direct-reading Dosimeter with Model 561 charger is less expensive. It may also be used for larger quantities where it is desired that personnel involved be able to read their own dosage at any time.

•

Model 3341 Pocket Chambers are special air condensers, charged before wearing. Radiation penetrating the chamber volume partially discharges the condenser. This discharge is proportional to the amount of radiation received.

Model 3341 has a capacity of 0.2 r. Chamber wall is a plastic with absorption equivalent to tissue. The clip provided makes it convenient in a pocket, on a belt or cuff, or any other place where radiation is received. A small aluminum cap protects the contact point and contains a dessicant to prevent discharge due to moisture. It should be read daily for a regular record of radiation exposure.

MODEL 3341 *Pocket Chamber*

Specifications

Recommended Charging Potential — 140 volts.
Radiation Capacity — 0 — 200 mr
Energy Dependence — ±10% from 100 kev to 5 mev.
Maximum Leakage — 5 mr/24 hrs.
Beta Energy for 50% Wall Absorption — 800 kev.
Size — ½" x 4⅝"
Weight — ½ ounce.

MODEL 2050A *Charger-Reader*

Model 2050A Charger-Reader is an all-electronic unit for simultaneously reading and recharging direct and indirect reading pocket chambers. A large panel-mounted meter assures easy dosage reading. A light is provided behind the charging socket so that the indication on self-reading type dosimeters may be easily seen, and provision is made for storing up to seven chambers in the case cover.

Specifications

Sensitivity — 3 x 10^{-10} coulombs (200 mr) full scale.
Input Impedance — 500 mmfd. Greater than 10^{14} ohms.
Charge Reading Accuracy — 5% of full scale.
Power Supply Required — 12 watts, 95 to 130 volts, 60 cycles.
Dimensions — 6¼" x 10-3/16" x 6-7/16".
Weight — 10 lbs., shipping weight 13 lbs.

ONE YEAR WARRANTY

41A Dosimeter

Victoreen Instruments

The Victoreen Model 541A Dosimeter is a self-contained quartz fiber electrometer, complete with optical system which permits frequent personal checks on exposure. The chamber is charged on Model 561 or Model 2050A charger. The unit is read at any time by looking through it toward a light source. This type of chamber is useful to those who work intermittently in radiation areas and require a quick visual check on chance exposures. Rigid, yet light aluminum construction, with a .2 r capacity. The design of this chamber minimizes the effect of accidental exposure of the chamber to large amounts of radiation.

Specifications

Charging Potential — 180 volts maximum.
Radiation Range — 0 — 200 mr.
Energy Dependence — ±10% from 0.08 to 2.0 Mev.
Maximum Leakage — 5% in 24 hours.
Size — ½" x 4".
Weight — ½ ounce.

FILM BADGES

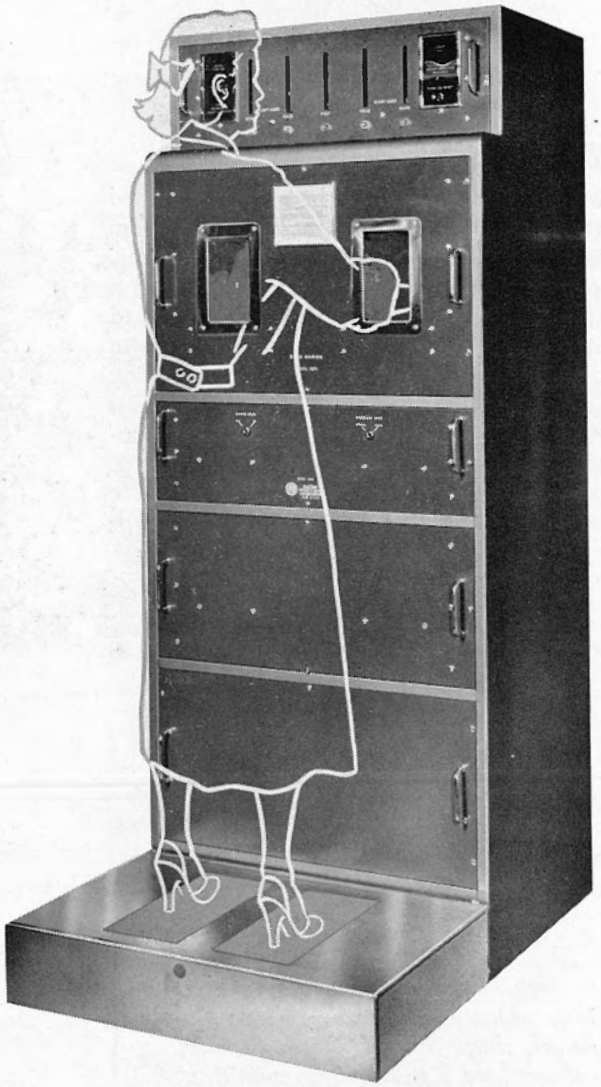
badges provide a permanent record of dosages, and should be worn constantly onnel engaged in radiochemical work. -Chicago's Film Badge Service, although not completely firm at the date of this catalog, will be available shortly after you receive the catalog. For details write to Film Badge Service, Nuclear Instrument and Chemical Corporation.

Charger is used to charge direct-reading dosi- s Model 541A. It is battery powered, with an source and one control knob. The charging ng-mounted to prevent possible damage to the the use of too much pressure. It supplies any een 110 and 225 volts, and is especially de- e with Model 541A.

Specifications

ver — Ten 22½ volt and one 1½ volt batteries.
nensions — 5¾" x 3¾" x 4¾" high.
ight — Three lbs., shipping weight 5 lbs.

MODEL 561 Charger



MODEL 1500

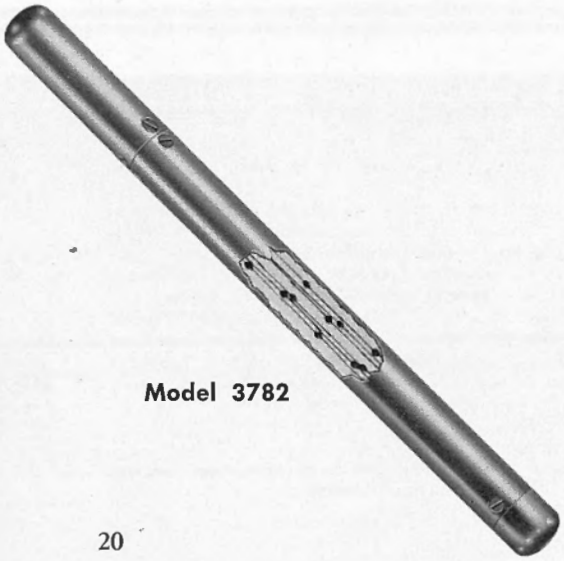
Hand and Foot Monitor

Model 1500 Hand and Foot Monitor provides completely automatic monitoring of beta-gamma contamination on the hands and feet of radiolaboratory technicians. Consists of a five channel scaler and power supply system with automatic controls to sequence and time counting operations. Lighted legends at eye level indicate operational stage or result of counting. One scaling channel is provided for each side of each hand, and one for the soles of both feet.

The automatic design of this unit makes it simple and foolproof to operate. The only exposed controls are the reset button and the switch placed in each hand slot. For safety, interlock switches disconnect the power from the entire unit when a chassis is unlocked and pulled out. Complete data available on request.

Specifications

Detectors — 16 thinwall (35-40 mg/sq. cm.) stainless steel halogen type GM counters. Nominal operating voltage — 900 volts.
Sensitivity — Minimum beta energy 200 Kev.
Tolerance — 10 cpm to 1200 cpm hands. 10 cpm to 2400 cpm feet.
Dimensions — 76" high, 32" wide, 24" deep without platform, 49" deep with platform.



Model 3782

MODEL 3782

Neutron Thermopile

Nuclear-Chicago's exclusive "Neutron Thermopile," Model 3782, is the only commercially available transducer for measuring high levels of slow neutron flux. It measures from 10^7 to 10^{12} thermal neutrons/cm^2/second, generating an EMF proportional to the neutron flux, and is insensitive to other radiation and temperature conditions. Detailed data on request.

MODEL 3783 MODERATOR

This special moderator adapts Model 3782 for measurement of fast neutrons. Detailed information on request.

ONE YEAR WARRANTY

MODEL 2610A *Count Rate Meter*

Model 2610A Count Rate Meter is a widely used monitor for general low level beta-gamma survey work in radioisotope laboratories. Also recommended as a low level monitor for Civil Defense applications and for geological surveying for radioactive ores. The Model 2610A is rugged, waterproof and light. Probe is conveniently mounted in the handle and is easily removed for surveying. The probe has a rotary shield for beta discrimination which, when closed, effectively cuts out beta radiation.

Unit can be hand carried or slung from shoulder with carrying strap. Simple one switch operation, with counts-per-minute and milliroentgen indication on rugged 2″ meter. Each instrument is carefully calibrated with gamma rays from radium in equilibrium with its short-lived decay products. Battery-operated, with internal components mounted on hinged shelf for easy maintenance.

Specifications

Range — Gammas—0.2, 2, 20 mr/hr. Betas—600, 6,000 60,000 cpm.
Circuit — Exclusive compensating circuit minimizes coincidence loss at high counting rates. Does not use vacuum tube voltmeter.
Detector — Model D50 geiger counter (see page 29).
Controls — Range switch operable by hand carrying the instrument. Sealed openings for earphone jack and calibration adjust.
Power — Battery operated with1-1½ volt, 1-67½ volt, and 3-300 volt batteries (supplied). Battery life is 100 hours continuous or 250 hours at 4 hours per day, except high voltage batteries which have shelf life. To order with vibrator power supply instead of 300 volt batteries specify Model 2610AP.
Dimensions — 10″ x 4¾″ x 5¾″.
Weight — 9 ½ lbs., shipping weight 13 lbs.
Supplied with geiger tube, batteries, double earphones, radium calibrating source, and instruction manual.

ONE YEAR WARRANTY

MODEL 2611 *Count Rate Meter*

Model 2611 is designed for general survey work in radiolaboratories, especially for Carbon-14, Sulfur-35, and other low energy emitters. Utilizing Model D35 counter, with 1.4 mg/sq.cm. window, it will detect energies as low as 40 kev. Probe is conveniently mounted in the handle and easily removed for surveying areas suspected of contamination.

Slip-on probe cap allows gamma surveying only and is readily removable for alpha and beta monitoring. Simple one switch operation, with count-per-minute and milliroentgen indication on rugged 2″ meter. Each instrument is carefully calibrated with gamma rays from radium in equilibrium with its short-lived decay products. Battery-operated, with internal components mounted on hinged shelf for easy maintenance.

Specifications

Range — Gammas — 0.2, 2, 20 mr/hr. Alphas or betas — 800, 8000, 80,000 cpm.
Circuit — Exclusive compensating circuit minimizes coincidence loss at high counting rates. Does not use vacuum tube voltmeter.
Detector — Model D35 end window counter (see page 28).
Controls — Range switch operable by hand carrying the instrument. Sealed openings for earphone jack and calibration adjust.
Power — Battery operated with 1-1 ½ volt, 1-67 ½ volt, and 3-300 volt batteries (supplied). Battery life is 100 hours continuous or 250 hours at 4 hours per day, except high voltage batteries which have shelf life. To order with vibrator power supply instead of 300 volt batteries specify Model 2611P.
Dimensions — 10″ x 4¾″ x 5¾″.
Weight — 9½ lbs., shipping weight 13 lbs.
Supplied with geiger tube, batteries, double earphones, radium calibrating source, and instruction manual.

ONE YEAR WARRANTY

PORTABLE SURVEY INSTRUMENTS

MODEL 2581 "Zeuto"

Ion chamber instruments can be used to accomplish specialized monitoring tasks for which geiger counters cannot be adapted, either because a larger thin window can be provided (as in Model 2581) or because a higher level of activity can be measured (as in Model 2585). These instruments operate at lower voltages than geiger counters and utilize electrometer tube circuits for accurate measurement of minute currents produced by ionization within the detecting chambers.

Model 2581 "Zeuto" is a light weight battery-powered, non-discriminating portable ion chamber. Ideal for contamination survey, especially with alpha and low energy beta emitters. No external probe is required as the detecting chamber has a thin sensitive window on the underside of the unit. Will detect 25 kev beta particles and 2 mev alpha particles as well as gamma and X-radiation. Large easy-to-read meter located on the top.

Specifications

Range — Low: alpha 6000 dpm, beta-gamma 4 mr/hr. High: alpha 60,000 dpm, beta-gamma 40 mr/hr.
Window — 3¾" x 5" protected by metal grill.
Controls — Range switch with OFF, ON, X1, X10 positions; feedback adjustment knob for adjusting minimum response time; and zero adjust knob mounted on top panel. Feedback and zero adjust knobs operable only when depressed. Coarse zero adjustment located on side of case. No high-meg resistor switching.
Power — Battery operated — one 1.5, three 7.5, and two 22.5 volt batteries. Battery life is at least 200 hours.
Weight — 7½ lbs., shipping weight 10 lbs.
Supplied with batteries and instruction manual.

MODEL 2585 "Cutie Pie"

Model 2585 "Cutie Pie" is a new, easier handling version of this well-known ion chamber survey meter. Excellent for general area measurement with field intensities above those measured by Model 2610A. New lighter weight (3 lbs.) permits one-hand operation, with off-on and range switch easily operated with the thumb. Measures 50, 500, and 5000 mr/hr full scale indicated on rugged 2" meter.

External calibration and meter zero adjustments are mounted on the top of the housing. Measures gamma intensity, and has a thin window on end of barrel for betas. Battery-powered with easy access to batteries and low drain 1 tube circuit. For easy service when necessary, the entire circuit and chamber are easily removed from the housing.

Specifications

Range — 50, 500, 5000 mr/hr. Beta window 1mg/sq.cm. can be opened to permit entry of 40 KEV betas.
Circuit — Trouble free one-tube circuit utilizes 5803 electrometer.
Calibration — With radium in equilibrium with its short-lived decay products. Accuracy is 10% of full scale, maintained throughout specified battery life.
Controls — Thumb operated switch for OFF, ZERO SET, X100, X10, X1. Separate controls for zero adjustment and calibration.
Power — Four 22½ volt batteries and one 1½ volt mercury cell easily available for replacement. Life is 100 hours continuous, 250 hours at four hours per day.
Housing — Light-weight cast aluminum case for good balance permits setting instrument upright.
Dimensions — 6" x 4" x 12½".
Weight — 3 lbs., shipping weight 5 lbs.
Supplied with batteries and instruction manual.

ONE YEAR WARRANTY

ONE YEAR WARRANTY

MODEL 2111 "Pee Wee"

Model 2111 "Pee Wee" is a portable proportional survey instrument used with Model AP1 and AP2 probes (see page 29) for the detection of alphas only in the presence of beta or gamma radiation. The amplifier has better than 2 millivolt sensitivity, and batteries provide up to 2400 volts d.c. for proportional counting. The easily read 2″ meter shows count rate up to a maximum of 20,000 disintegrations per minute, and is calibrated for 20% overall detection efficiency. Convenient push button quickly returns meter to zero reading after exposure. The amplifier is mounted on a plug-in board, easily removable for servicing.

For neutron monitoring Model 2111 is used with Models DN-1 and DN-2 at lower voltage. (See page 29). When order Model 2111, specify detector which will be used so proper voltage adjustment can be made.

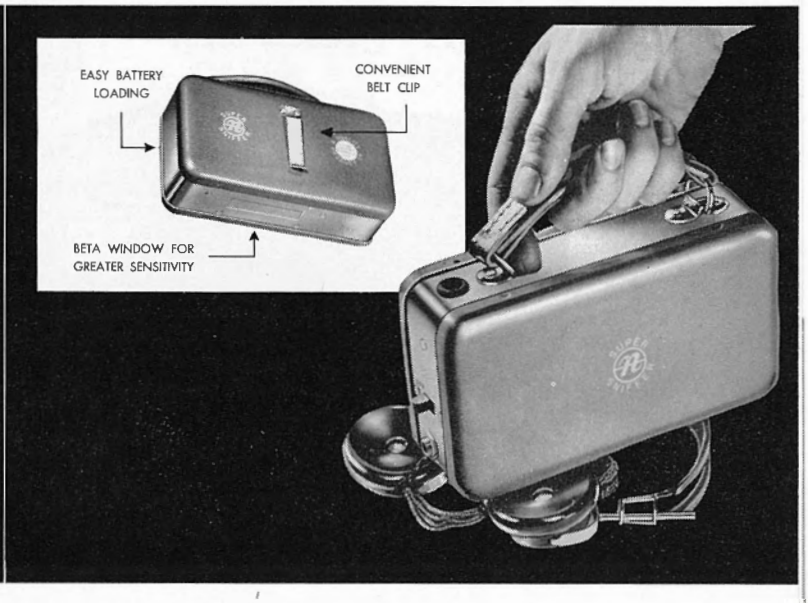
A canvas carrying case can be supplied for Model 2111 if desired. Details on request.

Specifications

Range — 0 to 2000 and 0 to 20,000 dpm.
Amplifier — Two-stage, resistance coupled amplifier with two-tube trigger circuit mounted on plug-in terminal board. Meter reaches 90% of correct value in 20 seconds. Push button for reset to zero quickly after reading.
Discriminator — Pulse height selector permits counting alphas only in the presence of betas.
Power — Battery operated, two 1½ volt, one 67½ volt, and two 1200 volt batteries.
Dimensions — 8″ x 5½″ x 12″.
Weight — 18 lbs., shipping weigtht 23 lbs.
Supplied with cable and instruction manual. Order probes separately.

ONE YEAR WARRANTY

MODEL 2302 "Super Sniffer"



The new Model 2302 "Super Sniffer" is a self-contained unit for detecting gamma rays, x-rays, and medium energy beta particles. The "Super Sniffer" is especially well adapted for uranium prospecting because its small size and rugged construction make it a dependable prospector's tool. When the "Sniffer" approaches a source of radiation, there is a visual indication by means of a flashing neon light, plus a clicking in an attached pair of earphones.

A thin wall Geiger tube (Model D76) is located on the inside bottom of the case, allowing the whole unit to be used as a probe. A "beta window" permits medium energy betas (.7 mev) to pass through to the counter tube. The number of electronic components is held to a minimum for long operating life without circuit failure. Voltage transformation, regulation, and signal amplification are obtained by utilizing an unique Nuclear-Chicago circuit. Inexpensive to use, two flashlight-type dry cells supply the power. Belt clip and leather handle provided for convenient portability in the field.

Specifications

Detector — Model D76 (page 29).
Battery life — 12 hours continuous, 20 hours intermittent usage (Same as battery life in a flashlight).
High voltage — Regulated by tapped symmetrical varistor.
Dimensions — 7⅝″ x 4⅛″ x 2½″
Weight — 2¾ lbs., shipping weight 4 lbs.
Suppled with double earphones, batteries, radium checking source, U. S. government prospecting book, and instructions.

NINETY DAY WARRANTY

DEMONSTRATE RADIOACTIVITY

MODEL 1613A "Classmaster"

Nuclear's Model 1613A "Classmaster" Radioactivity Demonstrator is the only such unit complete with all accessories to make it adaptable for lecture or demonstration use, or for a complete course in elementary nucleonics. The "Classmaster" includes, in addition to the electronic unit, a Model D51 geiger tube in a separate probe, a calibrated mounting board, radioactive sources, set of absorbers, and a complete manual of instructions and experiments.

The "Classmaster" provides triple indication of radioactivity. A neon light flashes and a built-in speaker clicks for each disintegration detected. In addition, the count rate is indicated on a large meter. Since results obtained with the "Classmaster" are easily reproducible, it is also useful as a laboratory monitor.

Specifications

Range — 0 to 15,000 counts per minute.

Circuit — Utilities 6SN7 amplifier tube and a 2050 thyratron which drives the speaker, neon lamp, and count-rate meter. Voltage regulation is provided by a VR 150 tube.

Controls — Volume knob for loud speaker. Volts, Counts Per Minute switch controls meter indication.

High Voltage — Variable from 500 to 1200 volts.

Power Supply — 95-130 volts, 50-60 cycle, 60 watts.

Dimensions — Cabinet 10" x 13¾" x 9½"
Calibrated board 3⅞" x 25⅞" x 1"

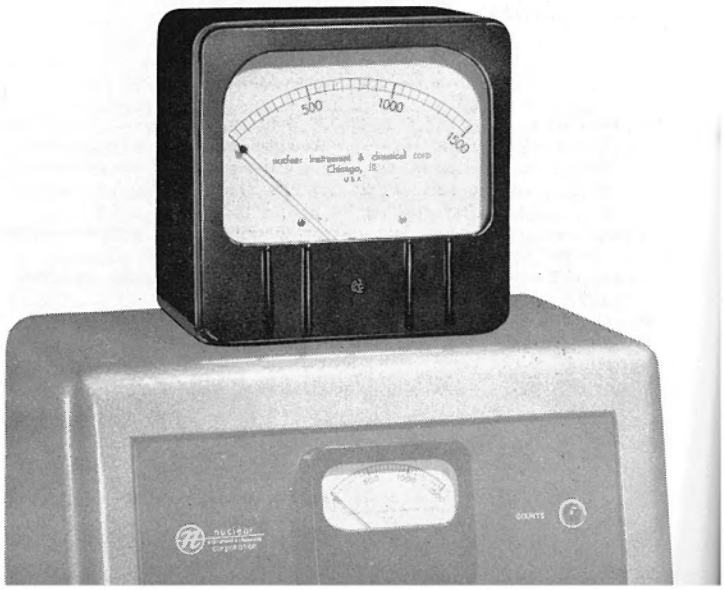
Weight — 24½ lbs. Shipping weight 32 lbs.

Accessories Supplied — 1 calibrated board, 2 sources, 20 cardboard sheets, 10 lead sheets, 15 aluminum sheets, 1 cardboard tube, 1 lead tube, 1 aluminum tube, and 1 instruction manual.

MODEL MR-1
Demonstration Meter

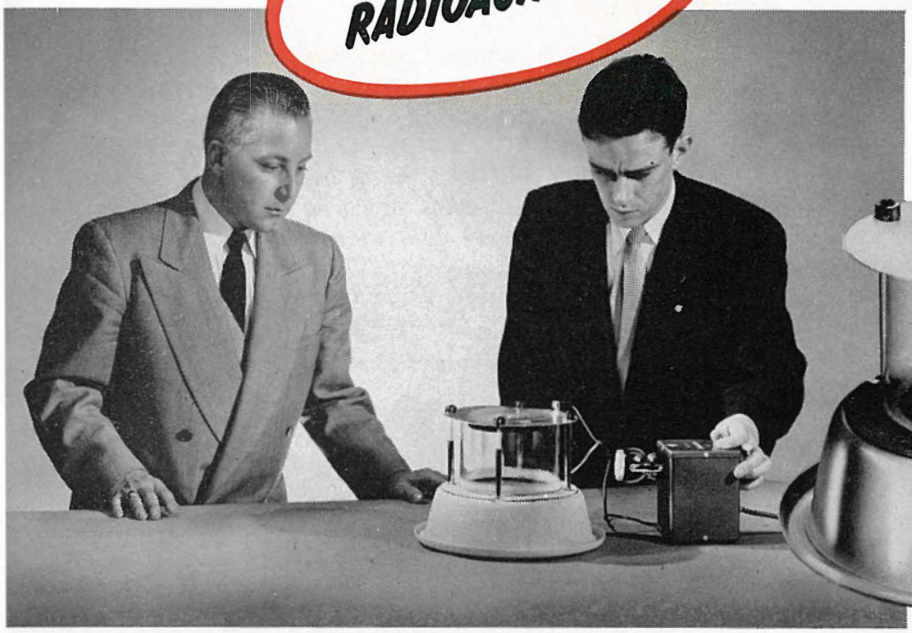
Model MR-1 is an important help for demonstrating radioactivity to a classroom. Use this seven-inch demonstration meter where a large group must be able to see the meter reading on the "Classmaster." The MR-1 plugs into a phone jack on the rear of Model 1613A.

Current Requirement — 0-1 milliampere
Dimensions — 7¼" x 7¼" x 4⅜"
Weight — 3¾ lbs. Shipping weight 6 lbs.



ONE YEAR WARRANTY

SEE RADIOACTIVITY



MODEL

1413

"Cloudmaster"

Specifications

Voltage Supply — Reliable one-tube vibrator power supply controlled by toggle switch. Completely shock-protected by 4.7 megohm "health" resistor. Supplies 1200 volts d. c. to chamber.

Chamber — 6-section unit with spun aluminum base. Black wrinkle finish on floor of chamber permits easy viewing of "tracks."

Operation — 2 lbs. of dry ice will operate chamber for around an hour.

Power Supply — 110-115 volts, 50-60 cycles.

Dimensions — Power Supply 4" x 4¼" x 5¼". Chamber 11½" diameter, 8½" high.

Weight — 8 lbs. Shipping weight 11 lbs.

Supplied Complete with all necessary components and instructions. No alcohol or dry ice.

Nuclear's exclusive Model 1413 "Cloudmaster" — a Continuous Cloud Chamber—provides a spectacular display of "tracks" caused by alpha, beta, gamma, and meson radiation. Vapor "tracks" occur in a sensitive layer about three-quarters of an inch thick near the floor of the chamber.

Recently introduced, it has become popular because of its simplicity and ease of operation. The sharp change in temperature necessary for the creation of the supersaturated "sensitive" layer is produced by easily-obtainable isopropyl alcohol and dry ice. Power unit provides necessary spot light and a 1200 volt d. c. "sweep voltage" to the cloud chamber. Completely safe electrical connections and radiation source. If suitable d. c. voltage supply is available, Model 1413C Cloud Chamber may be ordered separately.

BETA-GAMMA "Kounter Kit"

A build-it-yourself "Kounter Kit" for schools, civil defense classes, outdoor or prospector clubs—contains all the parts necessary to construct a portable survey instrument similar in size and specifications to Model 2302 Super Sniffer (see page 23). Complete easy-to-follow, step by step instructions are included, as are batteries, earphones, leather handle and radioactive checking source. Quantity prices on request. Not available in single units.

ONE YEAR WARRANTY ON MODEL 1413

DETECTORS

MODEL D46A

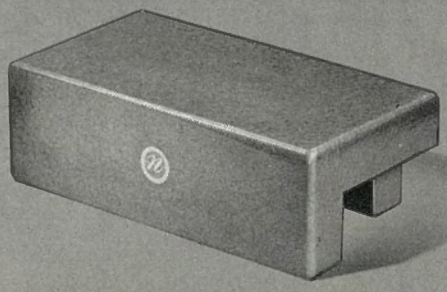
2-Gas Counter

Model D46A "Q-Gas" Flow Counter is an extremely sensitive detector for soft radiation such as that from carbon-14 and sulfur-35. It is two to five times as sensitive as thin end window counters because the radioactive sample is placed within the sensitive volume of the counter. Model D46A operates as a geiger counter at atmospheric pressure, using our exclusive "Q-Gas" mixture (see page 32), and output pulses are greater than ¼ volt, making it usable with any Nuclear-Chicago scaler or Model 1615B Rate Meter.

Operation is extremely simple. After the chamber has been flushed with "Q-Gas", a dry sample is introduced on the sample slide and preflushing is accomplished in about ten seconds by allowing gas to flow out of the counter over the sample for that period before closing the chamber. Samples can then be counted within the chamber, which is 100% efficient for alpha and beta particles.

Specifications

Plateau — Starts at about 1125 volts, with a slope of 2% per 100 volts over a 200-300 volt range.
Valves — Gas flow controlled by inlet and outlet valves on counter, and single stage pressure regulator on tank. Bubbler provided for monitoring rate of gas flow.
Background — Approximately 25 counts per minute unshielded, because of exclusive aluminum cathode limiter.
Sample Size — Accepts pans 1¼" in diameter and ⅛" high.
Resolution time — 100 microseconds
Dimensions — 9¼" x 5" x 5¼".
Shipping Weight — 50 pounds including regulator and tank.
Accessories Supplied — One tank "Q-Gas", one pressure regulator, 12 sample pans, 3 feet plastic tubing, supply of butyl phthalate bubbler oil and Silicone vacuum grease.



MODEL 3032 SHIELD

Model 3032 Lead Shield fits Model D46A only and reduces background count to approximately 17 counts per minute.

Specifications

Dimensions — 9¼" x 3" x 5¼"
Weight — 40 pounds
Shipping Weight — 54 pounds

MODEL D45 ALPHA COUNTER

Model D45 Methane Flow Proportional Counter will count alphas only, in the presence of high beta activity. Similar in construction to Model D46A, but has sample raising mechanism to provide up to 50% geometry.

Range — $5(10)^6$ dpm with Model 182 scaler.
Sample Size — One inch diameter.
Voltage — Approximately 2250 volts.
Dimensions — 6" x 9½" x 8" high.
Weight — 16½ lbs., shipping weight 21½ lbs.

ONE YEAR WARRANTY

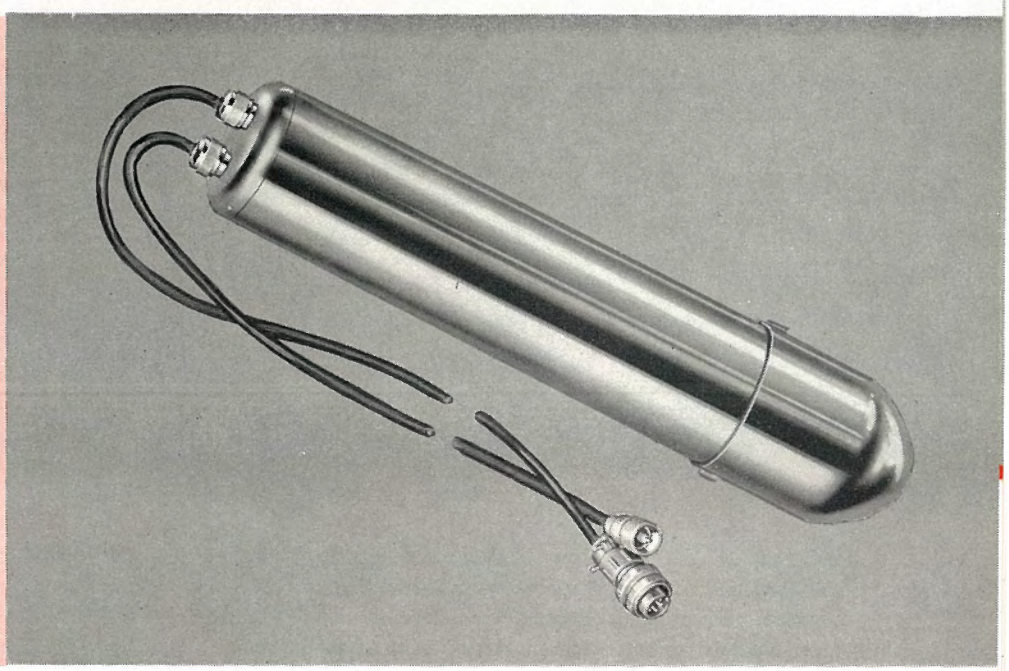
MODEL DS-1 *Scintillation Counter*

Model DS-1 scintillation counter is a detector of versatile design for efficient gamma counting in both clinical and laboratory applications. Shielding is arranged to provide excellent ratios of background to source counts when used with the external directional shield, or to act as a less directional detector when this shield is removed. Primarily intended for iodine-131 studies in connection with tumor diagnosis and thyroid uptake study, the Model DS-1 may be used with any Nuclear-Chicago scaling unit (except Model 180), Model 1615B count rate meter, or Model 1617 "Isotron" (see page 15), since output pulses are greater than one-quarter volt.

Since Model DS-1 is inherently stable, requiring no voltage regulator at the detector, counts are very reproducible and circuit conditions tend to give long operational life. Gamma efficiencies of 33% or greater are obtainable using cobalt-60 with the external shield in place. Plateau length of the Model DS-1 is 200-300 volts with maximum slope of 5% per 100 volts.*

Specifications

Efficiency — for Co^{60}, 39% without external directional shield, 33% with shield.
For I^{131}, 52% without shield, 48% with shield.
***Plateau** — Production tolerance requires plateau length of 300 volts and a slope not exceeding 5% per 100 volts for cobalt-60, using Model 172 scaler.
Connectors — Signal and six pin preamplifier connectors on six foot cables.
Crystal — Sodium iodide, thallium activated, ¾" x¾", hermetically sealed in spun aluminum can with glass window. Lucite light pipe with DC200 optical coupling fluid.
Phototube — Dumont K-1186 phototube magnetically protected by MuMetal shield.
Output — Pulse is greater than .25 volt and 20 microseconds duration from preamplifier utilizing 6U8.
Power Requirements — High voltage-1000-1500 volts at 20 microamperes. Low voltage-6.3 volts a. c., and 150 volts d. c. at 8 ma.
Mounting — Chrome steel jacket.
Dimensions — 16" long, 3" diameter
Weight — 16 lbs. Shipping weight 20 lbs.
Shipped with instruction manual.



MODEL 3036 *Counter Shield*

Model 3036 permits the use of Model DS-1 for gamma sample counting. It provides 1¾" of lead to shield the scintillation detector, reducing background to about 45 cpm. With Model 3036 the DS-1 will detect 10^{-10} curies of activity in urine and blood samples, permitting the use of extremely small amounts of gamma emitters as tracers in metabolism and other studies. Three accurately reproducible geometries for sample counting are provided.

Specifications

Sample Size — 1" to 1¾".
Shielding — Approximately 1½" of lead.
Dimensions — 6" diameter x 11¾" high.
Weight — 75 lbs., shipping weight 88 lbs.
Supplied with two plastic sample holders, 6 adapter rings, and 4 lucite scatter shields.

ONE YEAR WARRANTY

MODEL D33-D34-D35

These Mica End Window Counters are rugged halogen-quenched detectors with long life characteristics resulting from the use of a heavy gauge anode, stainless steel cathode, and halogen quenching vapor. Guaranteed for $5x10^{10}$ counts or even overvoltage without change in characteristics. Window of even the thinnest withstands finger tapping and large pressure changes. They may be sealed into wet or vacuum systems.

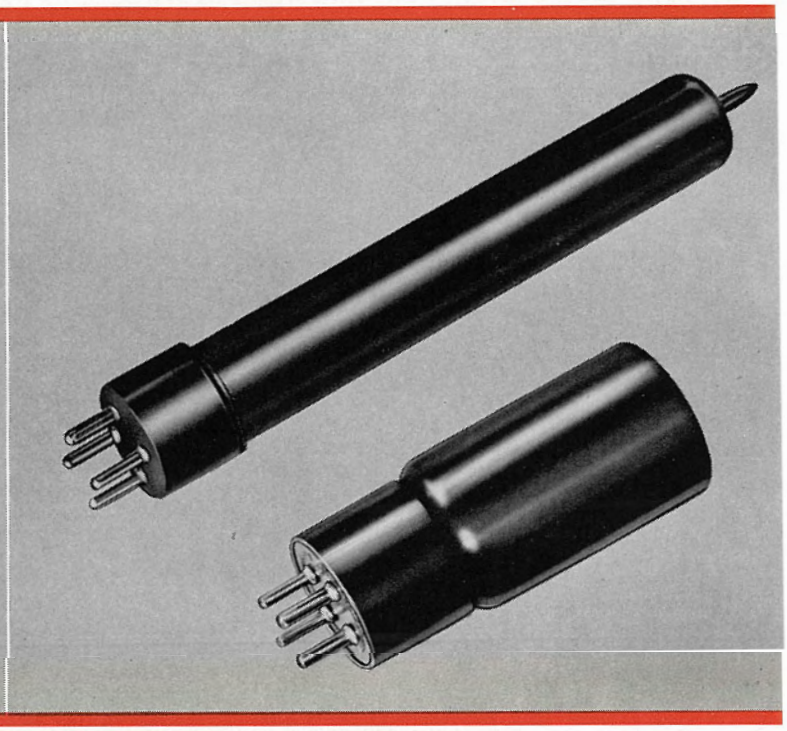
Model D34 and D35 have a window thickness of 1.4 mg. per sq. cm. for counting alpha and soft beta radiation. Model D33 has a window thickness of 3.5 mg. per sq. cm.

Specifications

	D33 D34	D35*
Operating Voltage	900 volts d.c.	900 volts d. c.
Plateau Length	in excess of 200 volts	in excess of 180 volts
Slope of Plateau	5%-10%/100 v.	10% per 100 volts
Dead Time (approx.)	200 microsec.	150 microseconds.
Background-Shielded 2" Lead	50 cpm max.	75 cpm maximum
Effective diameter of Mica Window	1-3/32"	25/32"
Cathode Material	Stainless Steel	Stainless Steel
Base	4 pin	Miniature cap
Overall Length	4-11/32"	6"

*For Model 2611 only

BISMUTH CATHODE TUBES



Bismuth cathode tubes provide high efficiency in the counting of gamma radiation. Available in two models with "side window" or "end window" construction. These counters are especially designed for medical use, but may be used for any gamma counting requiring improved sensitivity.

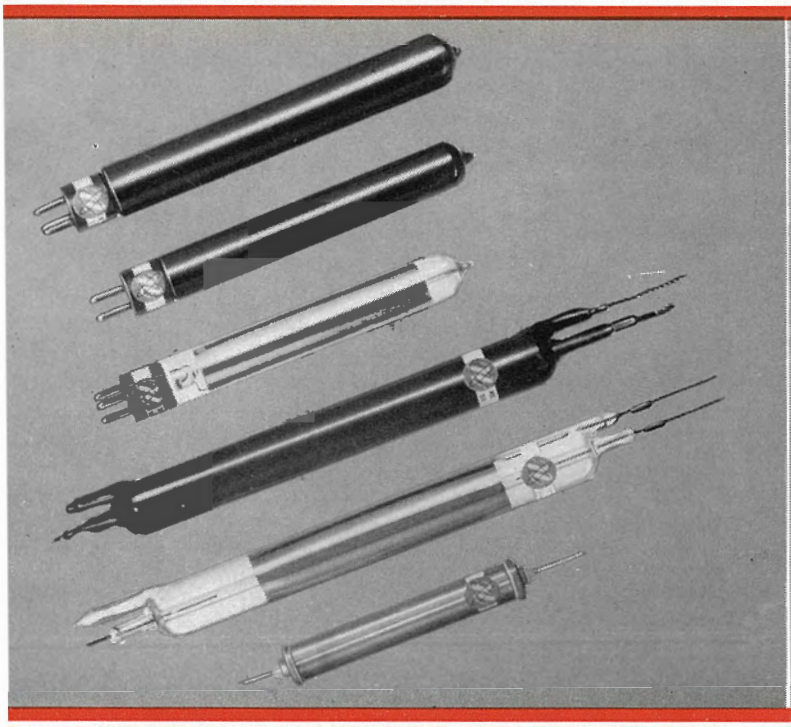
The side window counter has a measured efficiency of almost five times greater than ordinary G-M counters when used with iodine-131, and about 1½ times when used with radium. The end window counter is 7½ times more efficient for iodine-131 gamma radiation than similar shaped mica window counters. Either counter can be used with any standard circuit.

Specifications

	Model 12 Side Window	Model 13 End Window
Operating Voltage	1050	1050
Window Thickness	300 mg/sq.cm.	300 mg/sq.cm.
Plateau	150-200 volts	150-200 volts.
Counting Life	10^8 counts	10^8 counts
Dimensions	1" x 8½"	1½" x 3⅝"
Base	4-prong	4-prong

NINETY DAY WARRANTY

GEIGER COUNTERS



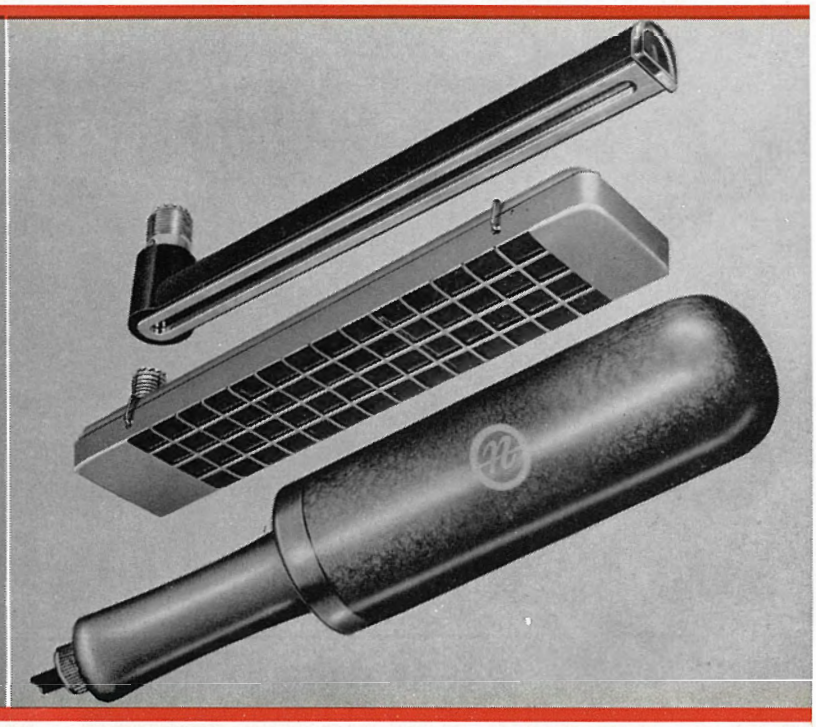
Nuclear self-quenching Geiger counters are available in several types and dimensions. Model D22 is useful for gamma detection only. Models D12, D50, D51 and D52 detect both beta and gamma radiation of over .2 mev. Model D76 is brass and will detect all gamma rays, and also beta radiation with energy of .4 mev or greater. Maximum life is 10^8 counts. Cathode materials vary as listed below.

Specifications

	D12	D22	D50	D51	D52*	D76
Max. Diameter (Inches)	13/16	13/16	¾	21/32	21/32	9/16
Overall Length (Inches)	8¼	8¼	6	5¼	5¼	3½
Cathode Length (Inches)	3	3	3	2½	2½	2½
Cathode Material	Carbon	Carbon	Carbon	Carbon	Silver	Brass
Base	None	None	3 pin	3 pin	3 pin	None
Window Thickness (mg/cm^2)	35	300	35	35	35	100
Plateau Length (Volts)	150	150	150	150	150	300
Plateau slope (%)	3	3	3	3	3	5
Operating Voltage	970	970	925	925	950	1200
Threshold Voltage	880	880	850	850	875	1050

*Model D52 is specially insulated for use as a dip counter.

PROPORTIONAL COUNTERS



These proportional counters may be used with Model 2111 Portable Meter or Model 182 or 172 Scaler. They can be adjusted to discriminate against beta or gamma background.

Alpha probes have a 1 mg./sq. cm. rubber hydrochloride window. Model AP1 is a pencil probe for small areas, the Model AP2 has a sensitive area of 75 sq. cm. protected by a metal grill. Both operate at 2250 volts, below the beta threshhold.

Neutron probes utilize BF_3 dectectors, with a paraffin moderator on Model DN-2. Model DN-1 monitors thermal neutrons, and can also be used to monitor higher energy neutrons with a suitable scale correction factor. Model DN-2 is designed for monitoring fast neutrons.

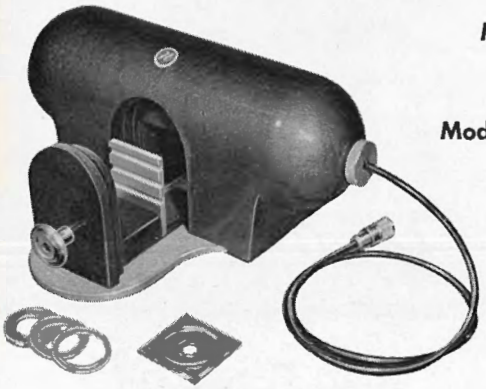
Specifications

	AP1	AP2	DN-1	DN-2
Particle Detected	Alphas	Alphas	Thermal Neut.	Fast Neutrons
Oper. Voltage	2250	2250	1650	1850
Beta Threshold	2300	2500		
Range	0-200	0-200	0-200N	0-20N
	0-20000	0-2000	0-2000N	0-200N
	dpm		/sq. cm./sec.	
Dimensions	⅜" x 7¾"	2" x 9"	¾" x 6½"	2¾" x 13"
Weight	2½ oz.	6¾ oz.	4 oz.	6 lb.

NINETY DAY WARRANTY

ACCESSORIES

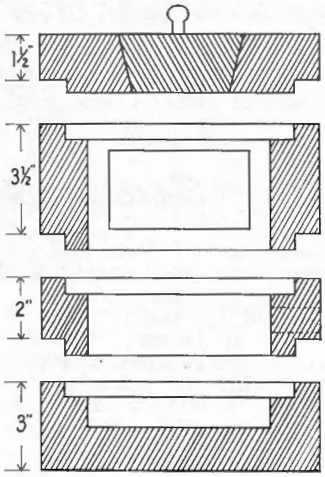
Model 3031B



Model 3030A

Model M2

Model 3029



MOUNTS AND SHIELDS

Model 3031B Shield and Manual Sample Changer provides approximately two inches of lead shielding for sample counting with end window counters. An aluminum liner and exclusive lucite scatter shields reduce backscatter to a minimum.

An unusual feature of this shield is the vertical adjustment of geiger tube position by a knurled knob to permit optimum counting efficiency with tubes of different lengths. Three accurate sample positions are provided, and two sample holders provide a means of manually replacing samples rapidly when counting a series of samples, since samples can be introduced from either side of shield.

Sample Size — 1" to 1¾"
Connector — Includes cable for scaler connection.
Dimensions — 6" diameter, by 12" high.
Weight — 94 lbs., shipping weight 107 lbs.
Supplied with two plastic sample holders, 6 adaptor rings for different size samples, and 4 lucite scatter shields.

Model 3030A Horizontal Shield provides 2" of iron shielding for counting beta or gamma samples with glass side window counters. Shield completely encloses sample being counted, and accepts Model D50, 51, or similar counters with 3-pin miniature base. Three sample positions provided, with lucite scatter shields to reduce backscatter.

Sample size — 1" to 1¾"
Dimensions — 14" x 5" x 4"
Weight — 85 lbs., shipping weight 100 lbs.
Supplied with sample holder, three adapters for different size samples, and two lucite scatter shields.

Model M2 Mount and Sample Holder provides an unshielded support for end window counters for counting well above background. Cast aluminum, with three accurate sample geometries, provides minimum backscatter. Can be shielded with lead bricks if desired.

Dimensions — 8" x 3⅝" x 4"
Weight — 3¾" lbs., shipping weight 5 lbs.
Supplied with plastic sample holder and three adapters for different sample sizes.

Model 3029 Adjustable Lead Shield can be used either to enclose G-M or scintillation counters or for storage of beta or gamma emitters in 1½" of lead. Its sectional construction makes it unusually flexible, since any reasonable height can be built up, with provision for bringing a cable in near the top or bottom by ordering one section 3029-E with each group of sections. Section 3029-C provides a side opening to permit using a counter inside or reaching in to grasp sources. Open inside diameter is 6".

Cast entirely of antimonial lead for hardness, with nickel alloy plating to prevent deformation of the sections with use. Detailed information on request.

Model 3029-A Base section — 56 lbs.
Model 3029-B Center section — 28 lbs.
Model 3029-C Center, with door — 55 lbs.
Model 3029-D Top, with plug — 46 lbs.
Model 3029-E Center with cable hole — 28 lbs.

ONE YEAR WARRANTY

HIGH VOLTAGE SUPPLY

Model 1090A High Voltage Supply provides continuously variable d. c. from 0 to 5000 volts, plus or minus, for proportional counters and other low drain use.

Range — 0 to 5000 volts d. c., positive or negative. Maximum filtered output 200 microamperes.
Controls — OFF-ON switch with pilot, two-position switch for positive or negative output, and continuous high voltage adjustment controlled by panel knob. Voltage indicated on 4" meter.
Regulation — Less than 0.5% change for line voltage change from 95 to 130 volts. Ripple voltage less than 0.1 volt a. c. at 5000 volts d. c. Utilizes magnetic amplifier (saturable reactors) fed back for regulation.
Power — 100 watts, 95 to 130 volts, 60 cycles only.
Weight — 76 lbs., shipping weight 86 lbs.
Supplied with three foot high voltage cable and instruction manual.

Model 1090A

Model 2091A Voltage Supply replaces three 300 volt batteries in portable geiger counters like Model 2610A. It eliminates costly battery replacement and operates from three 1½ volt cells.

Input — 3 to 4½ volts at 70 milliamperes.
Output — 900 volts plus or minus 15 volts at 2 microamperes.
Operating Life — 1000 hours minimum.
Size — 2¾" x 3¾" x 2¼".
Weight — One pound, shipping weight two pounds.

Model 2091A

PULSE GENERATOR

Model 1022 Pulse Generator provides positive or negative pulses for checking scaler or rate meter sensitivity, operation, and maximum repetition rate. Continuously variable pulse heights indicated on non-fluctuating direct reading meter. Two of these pulse generators can be coupled together to form an unusually flexible double-pulse generator for measurement of resolution and other properties of scalers and amplifiers.

Range — Three ranges of 0-.5, 0-5 and 0-20 volts, continuously variable, positive or negative.
Circuit — Stable, gives 1, 10, or 1000 microsecond pulse width with 0.2 microsecond rise time and 0.4 microsecond decay time.
Pulse rate — 3600 cpm from line frequency, or may be used with external oscillator (such as Hewlett-Packard Model 200C) for repetition rates up to 200,000 cycles per second.
Connectors — Output post on front panel connected in parallel with connector on rear of chassis. Input post also on front.
Power — 70 watts, 110 to 125 volts, 50-60 cycles.
Weight — 22 lbs., shipping weight 27 lbs.
Supplied with instruction manual.

Model 1022

LINEAR AMPLIFIER

Model 1061 Linear Amplifier is designed for use with Nuclear-Chicago G-M scalers (except Model 180) for proportional counters requiring a stable, high gain linear amplifier. Convenient sensitivity adjustment, calibrated in millivolts and with a choice of from 1 to 100 millivolts maximum sensitivity. Rise time is 0.2 microseconds. Time constant of input network is approximately 5 microseconds. Oscilloscope terminals for viewing amplifier output are on the front panel, and cable connections are on the rear of the chassis. Off-on switch permits independent operation of scaler without disconnection. (Specify scaler to be used).

Range — 1 to 100 millivolts, with choice of 1 to 10 and 1 to 100.
Resolving Time — Better than 5 microseconds.
Circuit — Rise time of 0.2 microseconds with two feedback loops. Overall gain is 300.
Pulse Height Discriminator — Variable in 10 steps from 1 to 10 millivolts. Built-in trigger pair sends shaped pulses to scaler.
Power Supply — 6.3 volts a.c., 150 and 300 volts d.c., drawn from associated scaler.
Weight — 15 lbs., shipping weight 21 lbs.
Supplied with input cable and power cable and instruction manual.

Model 1061

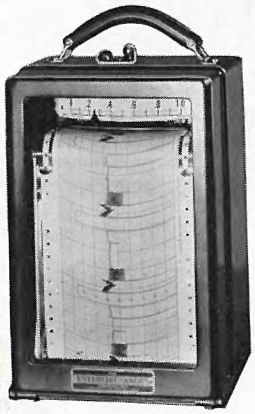
ONE YEAR WARRANTY

ACCESSORIES

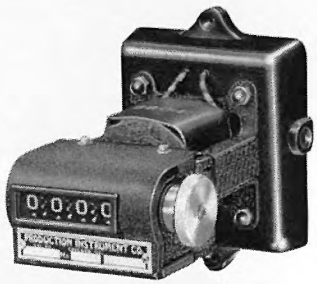
Model T1

Model T2

Model T-100



Esterline-Angus*



Model EC-84*

Ametron*

* NINETY DAY WARRANTY

TIMERS

MODEL T1 DUAL TIMER provides either preset time or elapsed time from two seconds to 60 minutes with ¼ second increments, when used with Models 163, 182, and 183 scalers, or other scalers suitably modified. Uses 110 volt 60 cycle supply from the scaler, (50 cycle model available). Incorporates own switch for other control purposes. With connecting cable (specify scaler) and instructions. Dimensions 4¾" x 4½" x 4½". Shipping weight 6 lbs.

MODEL T2 TIMER is a medium-priced unit designed for use with the Model 182 scaler or other suitably modified scaler. Provides preset or elapsed time from 0 to 55 minutes. Dimensions are 4¼" x 6¼" x 2½". Shipping weight 5 lbs.

MODEL T100 TIMER is a reliable five digit drum type timer which indicates elapsed time in minutes and hundredths of minutes. Operates with any Nuclear-Chicago scaler, or by itself directly from 110 volt 60 cycle line. Convenient off-on switch in line cord. Dimensions 3½" x 3¼" x 3¼". Shipping weight 4 lbs.

MODEL SM60 TIMER is an electric stop clock showing elapsed time in minutes and seconds. Available with electric reset at a slight extra cost. In black plastic case with glass covered register face. Dimensions 4½" x 4¼" x 4¼". Shipping weight 5 lbs.

RECORDERS

Model EC84 Register is an external four digit count recorder for use with any scaler without a built-in register. Manual reset. Rated over 600 counts per minute. Operates from pentode used as register driver or any type of switch or relay with low energy drain. Rated 230 volts.

Dimensions — Base 3⅝" x 4¾". Height 5⅜".
Weight — Shipping weight 4 lbs.

The Esterline-Angus Recorder Milliammeter gives a continuous chart record of radiation count rate, and plugs into Model 1615B (page 16). It is an integral part of the Model 1617 "Isotron" (page 15) and is used with Model C-100 Radio-Actigraph (page 33). Supplied with carrying handle and synchronous motor for 120 volt, 60 cycle operation. Shipping weight 28 lbs. F.O.B. Indianapolis. Detailed specifications on request.

The Ametron Count Recorder is used for counting and automatically recording register or other electrical impulses. Solenoid actuation is capable of 1000 counts per minute, and is actuated by the register driver of the scaler. Data recorded clearly on paper tape with figures 3/16" high. Available for predetermined time or count printing, in a variety of arrangements. Write for details.

Q-GAS

Nuclear-Chicago's exclusive "Q-Gas"† is a patented mixture of the highest purity, unexcelled as a geiger counting gas at atmospheric pressure. (Model D46A operation is not guaranteed with other gas mixtures.) Available in pressed steel cylinders with 855 cubic inch capacity, filled to approximately 1500 pounds pressure. When ordering, please specify whether you wish to purchase the tank or to receive it on a monthly demurrage basis, with a sixty day free period.

Composition — 98.6% helium, 1.4% butane
Shipping weight — 35 pounds

†Nuclear-Chicago is exclusive licensee under patent 2,519,864.

ONE YEAR WARRANTY

SAMPLE SPINNER

The exclusive Model PM-1 Sample Spinner is designed to simplify the problem of sample preparation. It consists of a constant-speed turntable rotating the sample pan at constant speed. You can rest your hand on the stationery top surface as you spread the sample material on the rotating pan. An air blower unit, Model PM-2, to aid in drying homogenous solutions evenly, and Model PM-3, consisting of an upright. clamp, and socket to hold an infrared bulb (not supplied) should also be specified for a complete unit.

Turntable speed — 20 revolutions per minute.
Sample size — Up to 2".
Connectors — Inlet for compressed air, nitrogen, etc., for Model PM-2 air blower unit. Line cord; two female plugs for powering other instruments. OFF-ON switch provided.
Power — 95 to 130 volts, 60 cycles.
Dimensions — Base 8½" x 6¼" x 2".
Weight — 5 lbs., shipping weight 10 lbs.

Models PM1-2-3

SAMPLE STORAGE CABINET

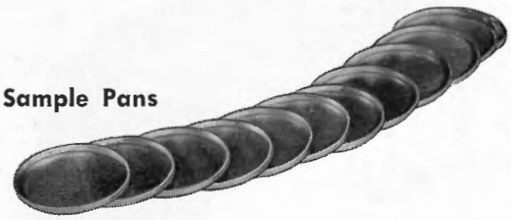
Model N4 Sample Storage Cabinet utilizes exclusive plastic Adapto-cups pressed into sample trays to accommodate 100 samples from 1" to 1⅜" in diameter. The 10 drawers each have 10 sample holders, each numbered for reference. Sample holders or trays easily replaced in case of contamination. Sturdy metal cabinet with tab holder on each drawer to permit labeling drawer contents. Measures 7" x 8" x 8". Plastic dust cover included. Shipping weight 7 lbs.

Model N4

SAMPLE PANS

Nuclear sample pans are available in three types. Cupped models are ⅛" deep.

AF-12 Flat aluminum pans — 1¼" diameter.
AC-12 Cupped aluminum pans — 1¼" diameter.
PC-12 Cupped clear plastic pans — 1¼" diameter.



Sample Pans

ABSORBERS

Model C-101 Absorbers, for energy discrimination or to reduce count rate, consist of standard aluminum and lead foil in plastic rings 1⅞" outside diameter. Each set is made up of twenty absorbers ranging from 2.33 to 1,680 mg/cm², supplied in a convenient fitted case.

CHROMATOGRAM SCANNER

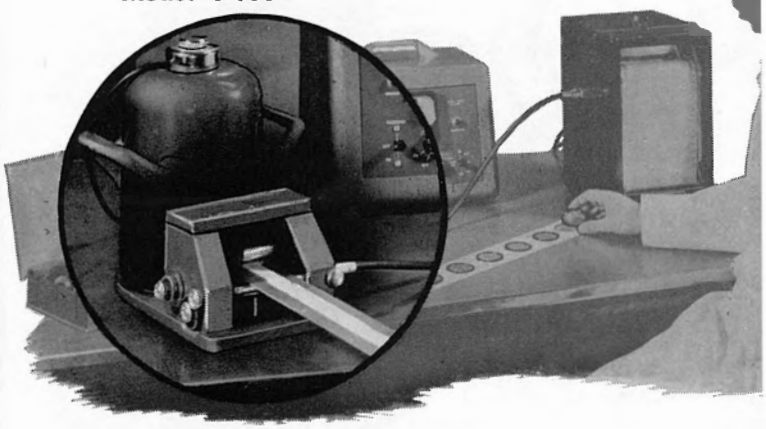
Model C-100 "Actigraph," when used with Model 1615B Rate Meter, Model 3031B Shield, Model D34 Detector, and an Esterline-Angus recorder, provides a complete system for automatically scanning strip chromatograms for radiolabeled spots. A flexible shaft from the recorder drives rollers which move the strip under the counter for scanning. A guide in the shield may be adjusted to let the counter "see" as much of the strip at one time as is necessary. The strip and chart move at the same speed, assuring precise correlation.

Special tables are also provided to permit the use of absorbers over a single sample to produce an absorption curve characteristic of that sample, or to permit use of the device as a simple sample changer for up to ten samples.

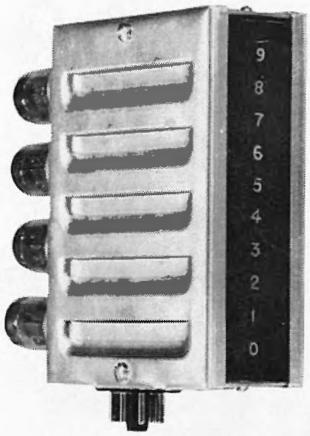
Dimensions — 6¼" x 10" x 5½" high without shield.
Weight — 10 lbs., shipping weight 14 lbs.

Models LC-100 includes Models C-100, 1615B, 3031B, D34, and the Recorder.

Model C-100



ACCESSORIES



Plug-in Scaler

Model 3033A

Model P2

Model P11

NINETY DAY WARRANTY

PLUG-IN SCALERS

Nuclear-Chicago plug-in scaling circuits are now available either as binaries or decades. The binary scale of 16 presents four interpolation lights and is available as 1-2-4-8, 16-32-64-128, or 256-512-1024-2048. Both binary and decade scale of 10 have an exclusive circuit easily connected for scale selection to scale of 4. Write for details.

Maximum Rate — Binary-200,000, decade-100,000, evenly spaced pulses per second.
Resolving Time — Five microseconds.
Input Required — 80 to 100 volt negative pulse with one microsecond rise time or less and duration of two microseconds.
Power — 6.3 volts at 1.2 amp., 300 volts d.c. ± 20% at 15 ma.
Mounting — Standard octal socket.
Tubes — Four computer-type 5963 tubes.

PROBES

The Model 3033A Lead Shield permits the use of a mica end window or bismuth cathode counter as a directional probe with any Nuclear-Chicago scaler or count rate meter. Ideal for use in medical applications such as brain tumor and thyroid studies. Shield provides ½" of lead and is open at one end with rotating beta shield. Can be hand held or attached to a movable arm (see Isotron, page 15). Measures 2½" in diameter by 6¼" long, with three foot cable. Shipping weight 8 lbs.

Model 3033B is similar to Model 3033A, but includes a preamplifier and 10 foot cable for satisfactory operation at a distance from the associated instrument. Shipping weight 10 lbs.

Geiger probes normally supplied with associated equipment are also available separately. Model P2 is chrome plated brass; P10 and P11 are finished in gray hammertone paint. All probes furnished with cable and connector.

Model P2 probe (used on Model 2610A) uses Model D50 counter, has revolving shield which exposes a 180° angle. Shipping weight 3 lbs.

Model P10 probe incorporates a preamplifier and ten-foot cable, accepts four-pin end window counters. Has built-in magnet for positioning on any ferromagnetic material. Shipping weight 4 lbs.

Model P11 probe (supplied with Model 1615B). Similar to Model P10 except this unit has a 3-foot cable and no preamplifier. Shipping weight 3 lbs.

CABLES

These cables, made for Nuclear-Chicago equipment, are assembled from the highest quality components. Coaxial connectors, chosen for required electrical properties, are standard equipment on all instruments.

PC2 — Amphenol 83 series or equivalent connector and 4-pin female socket with four foot cable.
PC3 — Amphenol 82 series or equivalent connector and 4-pin female socket with three foot cable.
PC4 — Amphenol 82 series connector and 83 series connector or equivalents with three foot cable.
PC5 — Probe cable for Model 2111. Two Amphenol 83 series or equivalent connnectors, using Teflon insulation, with three foot flexible cable.
PC6 — Amphenol 83 series or equivalent connector and 3-pin female miniature socket with four foot cable.
PC7 — Adapter to convert scaler input from Amphenol 82 series to 83 series.
PC8 — Two Amphenol 83 series or equivalent connectors with three foot cable.
PC9 — Two Amphenol 82 series or equivalent connectors with three foot cable.
PC23 — Register cable for Model EC-84.
PC24 — Adapter to convert four-pin chassis connectors to six pin, with three foot cable.
PC25 — Adapter to convert five-pin chassis connectors to six pin, with three foot cable.

ONE YEAR WARRANTY

SCALER CARTS

Model CA3 is a heavy-duty, all-welded stainless steel laboratory cart, designed for moving the heaviest of scalers and associated equipment safely. Rubber wheel casters are 4″ in diameter, and three deep tray shelves 18″ x 32″ with safety bars prevent accessories from rolling or sliding off open side. Equipped with push bar and rubber bumpers. 18″ x 27″ x 32″. Shipping weight 52 lbs.

Model CA2 is a lighter-duty cart, with 3″ rubber wheels and three shelves, the upper two with raised edges on three sides. Shipping weight 35 lbs.

Model CA3

CARRYING STRAP

Model N3 carrying strap is designed for use with Models 2610A, 2611, and other portable meters. Ideal for area surveying or prospecting. Heavy vinyl plastic strap is 1½″ wide and extends to 56″.

LEAD SHIELDING

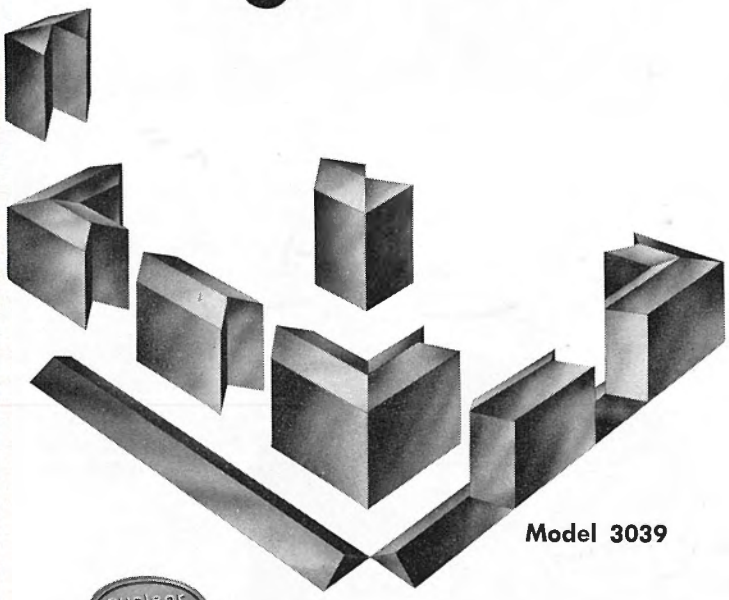
Lead Bricks, available in two types, provide a constant density radiation barrier for gamma or strong beta radiation.

Model 3038 bricks are rectangular in shape, and offer a radiation barrier at least cost.

Model 3039 interlocking bricks eliminate the low density "joint space" found between smooth faced bricks. Available in side, long corner, short corner, and base filler shapes. Study the dimensions shown and plan your enclosure size carefully, or write for special bulletin.

Model 3038 Rectangular Brick, 2″x4″x8″, ship. wt. 26 lbs. ea.
Model 3039A Long Corner, 4″x4″x2″, Ship. wt. 20 lbs. ea.
Model 3039B Short Corner, 4″x2″x2″, ship. wt. 7 lbs. ea.
Model 3039C Side Brick, 4″x4″x2″, ship. wt. 14 lbs. ea.
Model 3039D Base Filler, 2′ long, shipping wt. 10 lbs. ea.

Model 3029 Shield shown on page 30 may also be used for isotope storage.



Model 3039

REFERENCE SOURCES

Nuclear-Chicago offers three uncalibrated sources as references for instrument checking.

Model R2 is intended for checking Model 2610A and 2611. It contains 2 to 3 micrograms of radium in a plastic cylinder 1″ in diameter by ½″. One cylinder end gives approximately 10 times the radiation of the opposite end.

Model R20 is a Carbon-14 source giving approximately 200 disintegrations per minute, for checking sensitive counters such as Nuclear-Chicago Model D46A. Housed in 1″ diameter plastic disk ⅛″ thick.

Model R4 is a weak source for checking the Super Sniffer and other prospecting and monitoring units. Contains extremely small amount of radium salts. 2″ in diameter by ⅛″ thick.

Model R2

Model R20

Model R4

LIQUID COUNTER SET

Model LC1 Liquid Counter Set is designed for counting radioactive material in solution. It consists of a laboratory stand, clamps, a ring support with a beaker support, Model D52 Geiger counter, Model PC6 cable, and one each Marinelli beaker and test tube. The Marinelli beaker has a glass tube sealed in through the center so that the counter may be surrounded by gamma emitting liquid without wetting the counter.

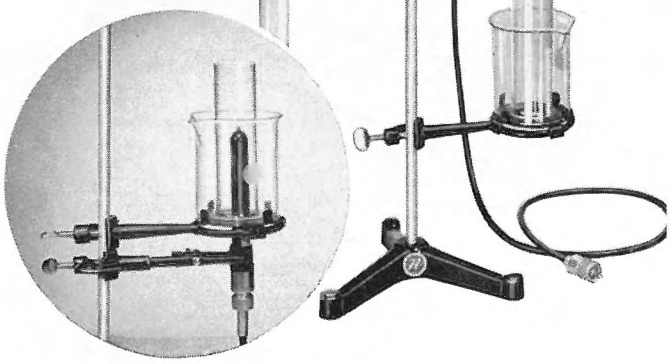
The test tube holds 20 cc of liquid when the counter is fully inserted, and the liquid will then surround the sensitive portion of the counter.

Shipping weight of Model LC1 is 7 lbs.

Model LB1 Marinelli Beaker for above set.

Model LT1 Test tube, available in dozen lots.

Model LC1



ACCESSORIES

Model N1

Model N2

Model N5B

SLIDE RULE

Nuclear-Chicago's exclusive Nuclearule is a special combination of scales arranged in circular slide rule form to simplify many calculations. It will quickly determine count rate, statistical error, coincidence loss, activity of sample versus half life, radiation flux after passage through absorbers, and other useful information. Measures 5¾" diameter. Complete with instructions and carrying case. Specify Model N1.

RADIATION WARNING

Model N2 Radiation Warning Tape is a series of individual labels 1½" long by 1" wide, printed in standard AEC colors on a continuous roll of "Scotch" tape. A quick, convenient method of labeling small bottles, boxes and source containers. More than 1700 labels per roll.

Model N5A Radiation Warning Sign uses "glowing" color to warn personnel of radiation danger. Use of "glowing" color assures that the sign will stand out against any background, even in dim light. Reads "Radiation Hazard" with standard AEC symbol, and has space for writing in type or level of radiation. Printed on medium weight card stock, using AEC colors. Size 4" x 6". Shipped in packages of 12, weight 2 lbs.

Model N5B Radiation Warning Stickers have "Kleenstick" coating on back. Removable paper back protects adhesive until used. Size 2¾" x 9". Shipped in packages of 6, weight 1 lb.

BERNSTEIN-BALLENTINE COUNTING SYSTEM

The Bernstein-Ballentine counting system, also described in the literature by Van Slyke, Steele, and Plazin, provides a sensitive method for counting carbon-14 in the gaseous phase. Used with Van Slyke-Folch apparatus to convert the sample to carbon dioxide, it consists of the necessary glass apparatus to purify the CO_2 and mix it in a glass proportional counter with the proper amount of dry methane. Model 182 is recommended as the scaler for use with this counting system. Write for additional details.

BATTERIES FOR PORTABLES

BA-002—1½ v, Burgess 2F.
BA-003—22½ v, Eveready 412E.
BA-005—67½ v, Eveready 467.
BA-006—300 v, Eveready 493.
BA-010—1½ v, Burgess TE.
BA-011—1224 v, Eveready W-5.
BA-015—Mercury Cell, General RG-3.
BA-016—15 v, Eveready 411.
BA-021—Mercury Cell, General RG-1.
BA-022—Mercury Cell, General RG-4.

FOR	ORDER
Model 2111	1—BA-005; 2—BA-010; 2—BA-011
Model 2383	1—BA-016; 1—BA-021; 2—BA-022
Model 2585	4—BA-003; 1—BA-015
Model 2610A, Model 2611	1—BA-002; 1—BA-005; 3—BA-006
Model 2610AP, Model 2611P	3—BA-002; 1—BA-005

SERVICE INFORMATION

Our Customer Service Department, with headquarters in Chicago, has established authorized service representatives at many points throughout the U.S. and Canada. For information about the authorized service representative in your area, contact our nearest district office or write to the home office in Chicago. Time loss and inconvenience can be avoided by using the services of nearby service representatives, but where necessary, the factory is ready to make necessary repairs promptly. To minimize the time required to obtain a repair, please write your nearest Nuclear-Chicago office and describe your problem. State the reason for the instrument return and the model and serial number of your instrument. In many cases we may be able to resolve your trouble without seeing the instrument. If repair is necessary, we will advise you promptly.

You can also speed the repair by issuing the necessary authorization or purchase order so that we receive it before the instrument arrives here. No charge will be made on repairs within warranty, but on other repairs it will be necessary to issue an invoice against your purchase authority. In each case, every effort is made to return instruments to you in first class operating condition as quickly as possible.

SUGGESTIONS for ORDERING

It is our desire to have our products in use where they are well matched to do the job. Therefore, wherever possible we suggest you give us a brief description of your projected work in advance of ordering, and allow us to recommend a suitable complement of instruments to solve your counting problems most efficiently.

When submitting a request for quotation or an order, do not forget to include the following information:

1) Model number (if requested upon receipt of your formal order, we can inform you of the equipment you will get. This is often necessary for Application Number AEC-313 used in procuring radioisotopes).

2. When ordering accessories please give the model and serial number of the instrument with which the accessories are to be used so we can furnish proper cable connectors or adapters.

3) Desired f.o.b. point (our published prices are all f.o.b. Chicago).

4) Desired delivery date.

5) Full information concerning shipping and billing addresses.

6) Method of shipment — all shipments will be Railway Express collect unless otherwise specified.

7) Invoice terms are 1% ten days, net thirty days, except in the case of foreign orders.

It is our policy to quote and make deliveries on a first come-first served basis. Should an urgent situation arise, we suggest you contact your nearest sales office, giving the details of your particular situation, and we will immediately do whatever we can to assist you.

EXPORT ORDERS

Nuclear-Chicago products are in use in various countries throughout the world and we, of course, will be pleased to supply equipment to foreign customers. Orders and correspondence from countries except the U.S., U.S. possessions, and Canada should be directed to our Export Department, listed below. All export orders are handled entirely by that department.

nuclear INSTRUMENT & CHEMICAL CORPORATION

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Silver Spring, Maryland

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