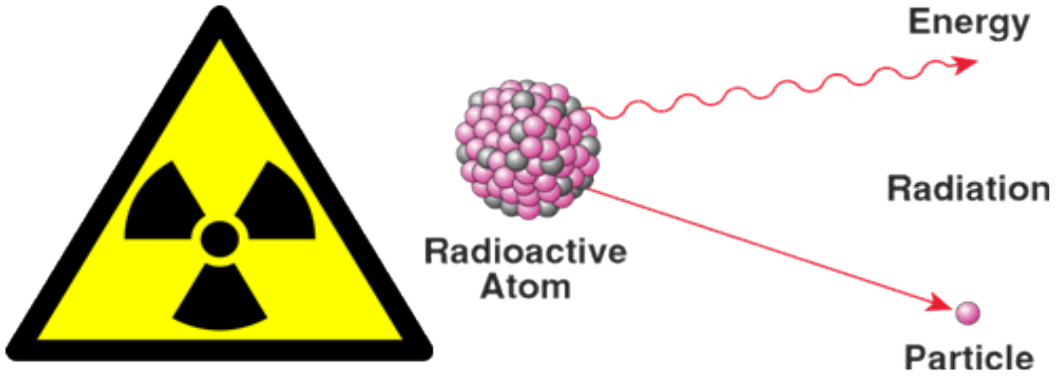
PROBE SELECTION GUIDE



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GRANDEZZE DOSIMETRICHE		
SI Sistema Internazionale	abbreviazione	Usato per misurare
Gray	**Gy**	- dose assorbita **(**equivalente al rad**)** - 1Gy = ! joule per Kg di materia - 1 Gy = 100 rad
Sievert	**Sv**	- dose equivalente **(**equivalente al rem**)** - 1 Sv = Gy x Q - 1 Sv = 100 rem
Becquerel	**Bq**	- radioattività **(**equivalente al Ci**)** - 1 Bq = 1 disintegrazione/secondo - $3,7x10^{10}$ Bq = 37 billion Bq = 1 Ci

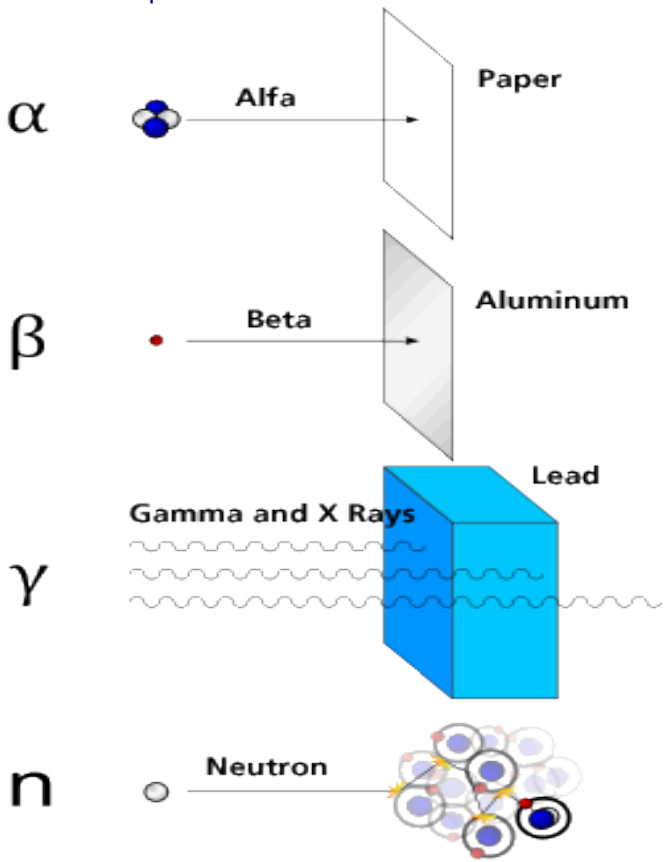
Unita USA	abbreviazione	Usato per misurare
Roentgen	**R**	- esposizione (obsoleta) - misura la quantità di ionizzazione in aria - 1 R = $2,58x10^{-4}$ coulomb x Kg di aria secca
Rad (radiation absorbed dose)	**rad**	- dose assorbita di energia da qualsiasi materiale - 1 rad = 100 erg per grammo di materia
Rem (Roentgen equivalent man)	**rem**	- dose equivalente a danno biologico in tessuto umano - rem = rad x Q **(**fattore di qualità**)** - Q = 1 raggi X , fino a 20 per neutroni o alfa
Curie	**Ci**	- radioattività - 1 Bq = 1 disintegrazione/secondo - 1 Ci quantità di materia che emette $3,7x10^{10}$ dis/sec

SPESSORE DI ATTENUAZIONE AD UN DECIMO PER DIVERSI NUCLIDI/MATERIALI						
materiale	piombo	Vetro al Piombo	Ferro	Calcestruzzo al Bario	calcestruzzo	mattoni
Densità in g/cm^3	11,34	Variabile, P	7,8	3,2	2,3	1,4
Co 60	4 cm	47/P cm	7 cm	16 cm	22 cm	36 cm
Cs 137	2,1 cm	32/P cm	5,5 cm	12 cm	17 cm	28 cm
Ir 192	1,7 cm	25/P cm	4,5 cm	10 cm	14 cm	23 cm

Un piccolo esempio per comprendere la differenza fra le varie unità di misura:

Immagina di essere sotto la pioggia,
la quantità di pioggia caduta si misura in Becquerel,
la quantità di pioggia che colpisce è misurata in Gray,
quanto è umido sul corpo è misurato in Sievert.

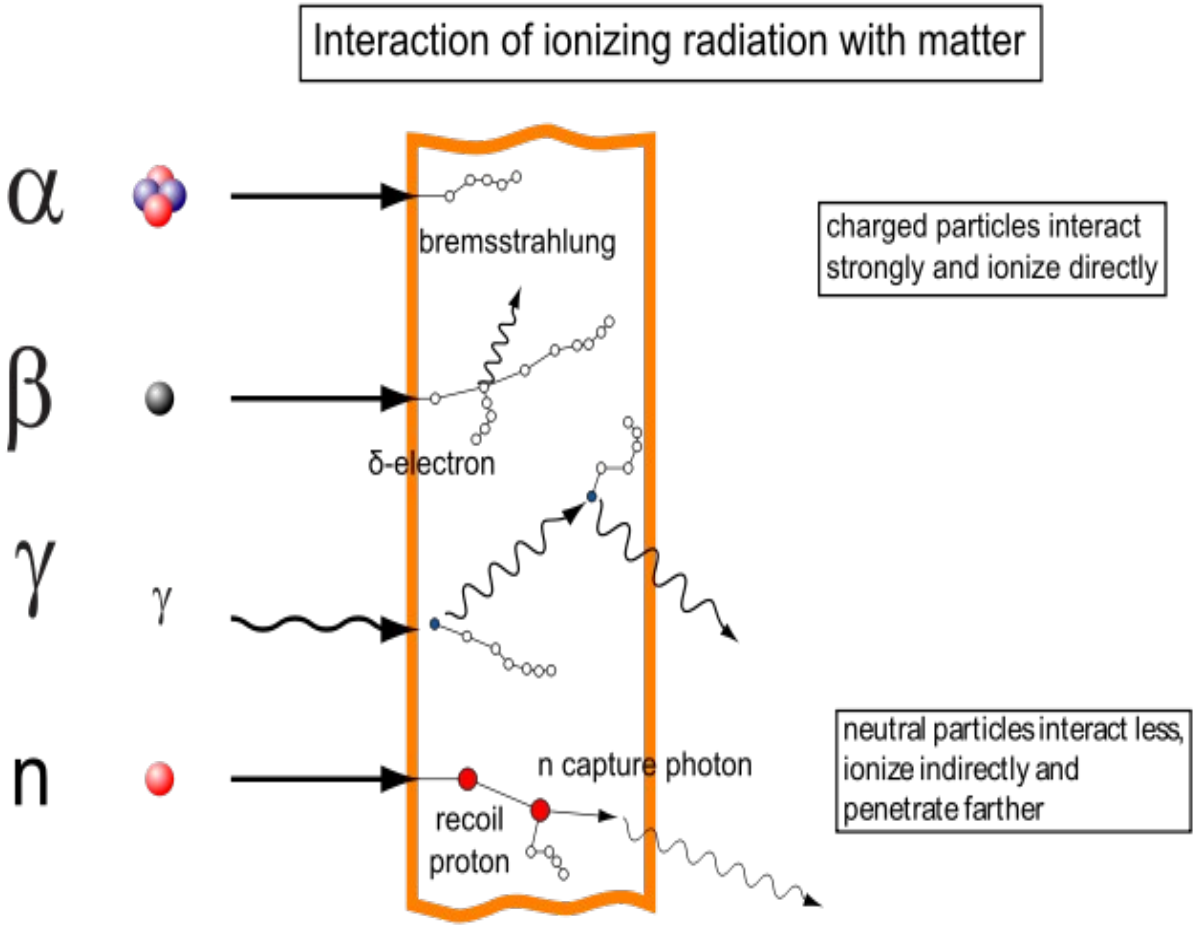
Vedi sito http://www.darvill.clara.net/nucrad/units.htm



"Legge dell'inverso dei quadrati della distanza"
esempio: misuriamo 10 millirem/ora a 10 cm dalla sorgente , la misura a 20 cm di distanza sarà 2,5 millirem/ora
calcolando la dose a 20 cm = 10 mrem/hr x (10 cm/20 cm)2 = 2.5 mrem/hr
quindi piccoli cambiamenti di distanza dalla sorgente corrispondono in grandi cambiamenti dell'intensità di esposizione

TIPI DI RADIAZIONE			
Tipo	**Alpha**	**Beta**	**Gamma**
simbolo	**α**	**β**	**γ**
massa atomica	4	1/1840	0
carica	+2	-1 o +1	0
velocità	bassa	alta	vel. Luce
capacità ioniz.	alta	media	0
range in aria	3 cm	3 m	elevato
range in tessuto	0,04 mm	5 mm	elevato
fermato da	Foglio carta	mm alluminio	cm piombo

EFFETTO DEI VARI TIPI DI RADIAZIONE		
radiazione	processo	effetto
Alpha	Collisioni inelastiche con gli elettroni legati	Eccitazione e ionizzazione
Beta	Coll. Inel. Elettr. Atomici	Eccitazione e ionizzazione
	frenamento nel campo nucleare	Emissioni Bremsstrahlung
Raggi X e Gamma	Effetto fotoelettrico	Fotone tot. Assorbito
	Effetto Compton	Fotone parz. Assorbito
	Produzione di Coppie	



Radioisotope	Half-Life	Significant Radiations	Comments
Sodium-22	2.6 yr	0.54 MeV positron; 0.51 and 1.27 MeV gammas	high beta and gamma dose rates
Iron-55	2.7 yr	Various low energy x-rays and Auger electrons (<6 keV)	does not present a significant external hazard
Cobalt-57	271.8 days	Gammas (< than 0.13 MeV)	
Cobalt-60	5.3 yr	0.31 MeV beta; 1.17 and 1.33 MeV gammas	high beta and gamma dose rates
Nickel-63	100 yr	0.066 MeV beta	does not present a significant external hazard
Strontium-90	29.1 yr	0.54 MeV beta from Sr-90; 2.26 MeV beta from Y-90	decays to short-lived Y-90; very high beta dose rates
Cesium-137	30.1 yr	0.51 MeV beta; 0.661 gamma from Ba-133m	decays to short-lived Ba-133m
Polonium-210	138.4 days	5.3 MeV alpha	does not present a significant external hazard
Radium-226	1600 yr	4.8 MeV alpha; various alphas, betas and gammas from decay	decays to Rn-222, with a long decay chain following
Americium-241	432.7 yr	5.6 MeV alpha; various alphas, betas and gammas from decay	decays to long-lived Np-237, decaying in turn to Pa-233 and U-233. Alpha emissions are the greatest concern.

vedi sito http://www.ehs.washington.edu/rsotrain/sealedsources/workingsafely.shtm

Radioisotope	Beta dose rate at 30 cm from source* (millirem/hr per millicurie)	Gamma dose rate at 30 cm from source (millirem/hr per millicurie)
Sodium-22	370	13.3
Cobalt-57	0	0.94
Cobalt-60	48	14,4
Strontium-90	740	0
Cesium-137	777	4.1
Americium-241	0	0,56

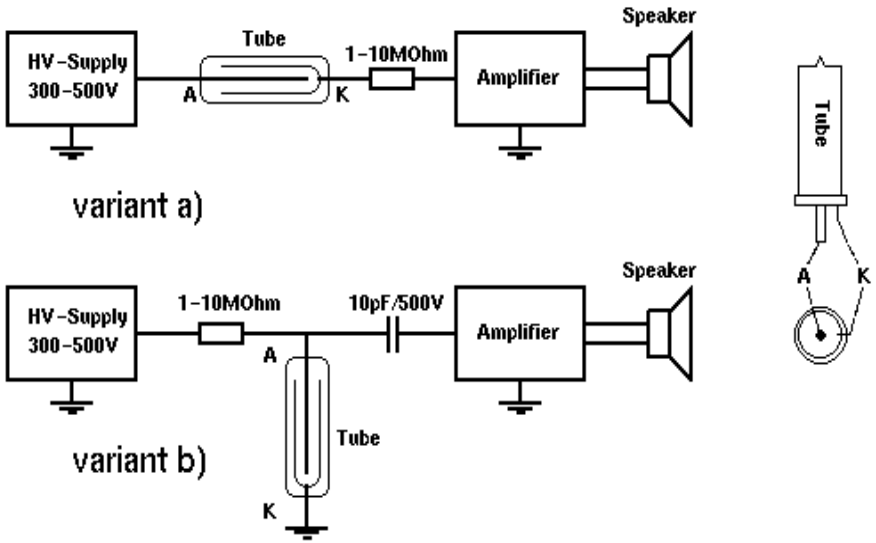
*Keep in mind that the annual skin dose limit is 50,000 mrem. Working for extended periods in close proximity with certain radioisotopes can lead to large doses.

Nuclear Radiation Detectors Scheme of detection of energetic charged particles Di S.S. Kapoor,V. Ramamurthy

Detection method	Detector type	Detection medium
Detection of Free Charge Carriers	Ionization Chambers	Gases Semi-conductors Si Ge Condensed forms of noble elements
	Proportional counters	Gases Liquids of noble elements
	Geiger-Muller counters and Avalanche counter	Gases
Light Sensing	Scintillation Detectors	Inorganic Crystals Organic Liquids and plastic Noble elements
	Cerenkov Detectors	Gases, Trasparent liquids and solids
Detection of free Charge Carriers + Light sensing	Hybrid Detectors	Gases, and liquids of noble elements (Argon, Xenon)
Track Visualization	Track Etch Detector	Minirals Glass Plastic

Lista (non esaustiva) dei materiali usati nei sistemi di rivelazione a scintillazione	
Bi4Ge3O12	Bismuth Germanate
CaF2	Calcium Fluoride
CaF2(Eu)	Europium doped Calcium Fluoride
CdWO4	Cadmium Tungstate
CsI	Caesium Iodide
CsI(Na)	Sodium doped Caesium Iodide
CsI(Tl)	Thallium doped Caesium Iodide
KBr	Potassium Bromide
KCl	Potassium Chloride
KI	Potassium Iodide
LiF	Lithium Fluoride
NaCl	Sodium Chloride
NaI	Sodium Iodide
NaI(Tl)	Thallium doped Sodium Iodide
RbCl	Rubidium Chloride
ZnWO4	Zinc Tungstate
BaF2	Barium Fluoride
BrilLanCe 350	Cerium doped Lanthanum Chloride (LaCl3)
Lithium Glass Scintillators	Cerium activated lithium silicate glass scintillators
YAG(Ce)	Cerium doped Yttrium Aluminum Garnet
BGO	Bismuth Germanate
BrilLanCe 380	Cerium doped Lanthanum Bromide (LaBr3)
CsI(pure)	Undoped Cesium Iodide
Fibers	Plastic Scintillating, Wavelength-shifting, Light Transmitting, and Fluorescent Fibers
NaI(Tl)	Thallium doped Sodium Iodide NaI(Tl) and Polyscin® NaI(Tl) Scintillation Material
PreLude 420	Cerium doped lutetium based (LYSO)

Lista (non esaustiva) dei più comuni gas usati nei rivelatori Geiger Muller				
Gas	simbolo chimico	W (eV)	E drift vel cm/µs	Electric field $V*cm^{-1}*torr^{-1}$
Neon	Ne	36,2		
Argon	Ar	26,4	0,4	0,8
Krypton	Kr	24		
Xenon	Xe	21,7		
Methane	CH_4	29,1	10	1
Ethylene	C_2H_4	28	0,5	1
Iso-butane	$I\text{-}C_4H_{10}$	26,3	2,5	1
Isobutylene	$I\text{-}C_4H_8$	26,7		
Heptane	C_7H_{16}		1,4	1
Carbon Dioxide	CO_2	20	9	8
Ar + 10% CH_4			5,5	0,2



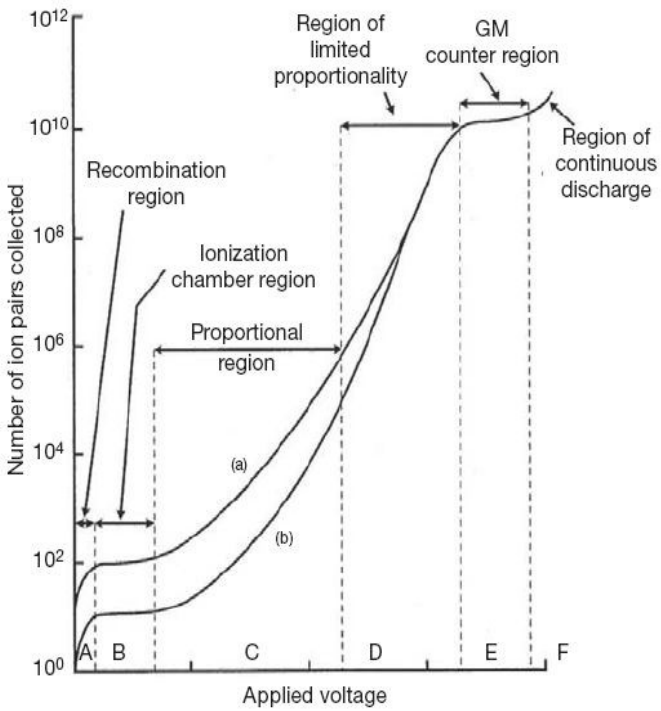
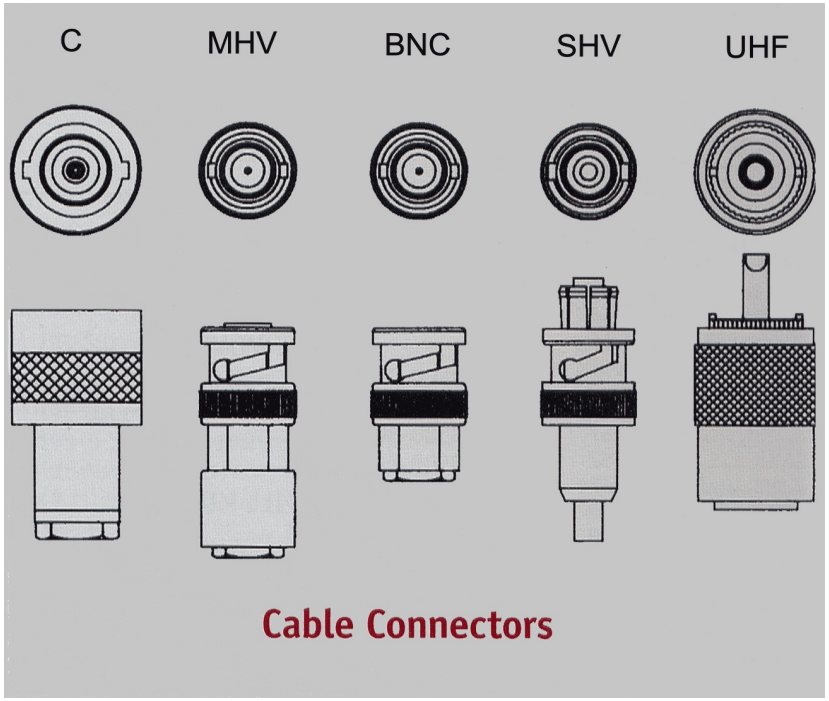
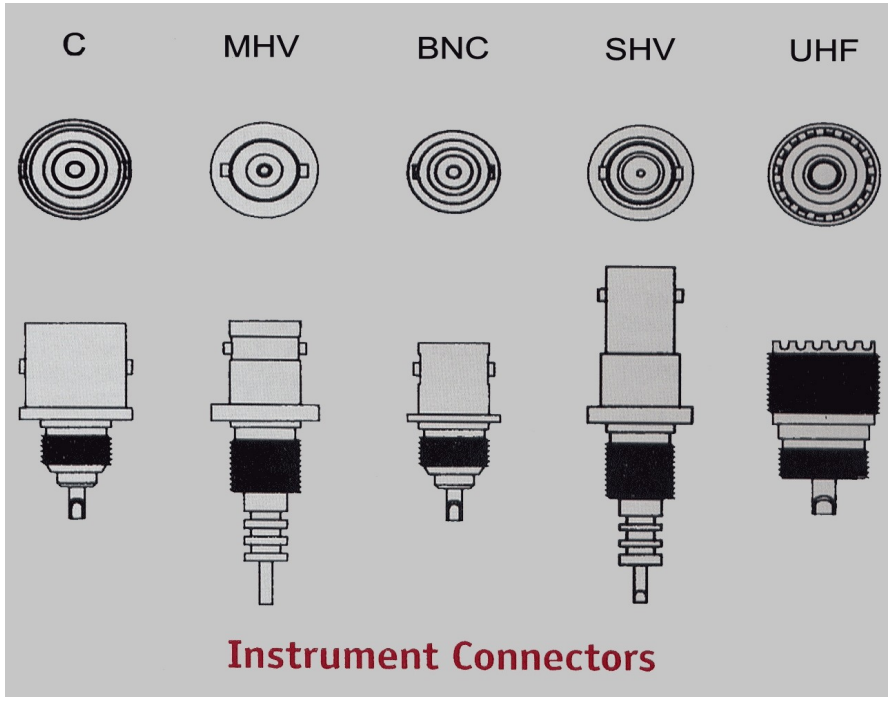


FIG. 4.1. Various regions of operation of a gas filled detector. Region A represents the recombination region, region B the ionization region, region C the proportionality region, region D the region of limited proportionality and region E the GM region. Curve (a) is for 1 MeV β particles, curve (b) for 100 keV β particles.

schemi di collegamento tipici dei tubi geiger

vedi sito http://www.ludlums.com/ > support > connector type





LEGENDA

$$CC = \frac{(\text{CPM/mR/hr} * 60\text{min/h})}{0.001\ \text{R/mR}}$$

come esempio una sonda Pancake Ludlum44/9 con sensibilità 3300CPM/mR/hr
CC=(3300 x 60)/0.001 = $19.8*10^7$cont/R sugli strumenti segnato con: cc= 19.8+07

DT - tempo morto, correzione statistica, tempo di insensibilità sonda, importante solo per alti valori di impulsi (reperibile dal costruttore)

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
produttore	modello	tipo sonda	(Volt)	alfa	beta	gamma	Costante di calibrazione	(microsecondi)			superficie area sensibile	

la sonda risponde in maniera diversa in base alla tensione di alimentazione ed in funzione degli isotopi presenti.
nella figura 4.1 sono schematizzate le 6 regioni operative

A- L'EFFICIENZA DI UNA SONDA CON SORGENTI ALPHA E MAX 15%

B- EFFICIENZA BETA E' RILEVABILE CON LA SEGUENTE FORMULA:

$$Ef\ \% = \frac{(\text{CPM misurati} - \text{CPM fondo})}{\text{DPM sorgente campione}} * 100$$

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
AMPEREX	6980	HOT DOG	900		X	X		100		720		
AMPEREX	100NB	END WINDOW	900		X	X		100				
AMPEREX	120NB	END WINDOW	900	X	X	X		300				
AMPEREX	1B85	HOT DOG										
AMPEREX	200NB	END WINDOW	900	X	X	X		200				
AMPEREX	85NB	HOT DOG	900		X	X		100		720		
ANTON	114	HOT DOG	900		X	X		100		720		
ANTON	6993	HOT DOG	900		X	X	43.2+06	100		720	12,0%	
BICRON	PGM	PANCAKE	900	X	X	X				900		

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
CANBERRA	2000	PANCAKE	900	X	X	X		50		3.500		
CANBERRA	2001	PANCAKE	900	X	X	X		50				
CANBERRA	2006	PANCAKE	900	X	X	X		70		3.500		
CANBERRA	2011	PANCAKE	900	X	X	X		90		1.500		
CANBERRA	2100	END WINDOW	750	X	X	X		50		50		
CANBERRA	2106	END WINDOW	900	X	X	X		70		500		
CANBERRA	2111	END WINDOW	500	X	X	X		90		1.200		
CANBERRA	2112	END WINDOW	500	X	X	X		90		1.200		
CANBERRA	2121	END WINDOW	575	X	X	X		100		1.700		
CANBERRA	2123	END WINDOW	900									
CANBERRA	2126	END WINDOW	900	X	X	X		150		2.700		
CANBERRA	2131	END WINDOW	900	X	X	X		200		1.650		
CANBERRA	2135	END WINDOW										
CANBERRA	2200	THIN WALL	900		X	X		100		5.275		
CANBERRA	2202	THIN WALL	900		X	X		75		2.900		
CANBERRA	2206	THIN WALL	900		X	X		90		635		
CANBERRA	2211	THIN WALL	900		X	X		150		1.550		
CANBERRA	2216	THIN WALL	900		X	X		150		4.800		
CANBERRA	2300	THIN WALL	900			X		20		175		
CANBERRA	2305	THIN WALL	500			X		90		1.200		
CANBERRA	2306	THIN WALL	900			X		100		950		
CANBERRA	2311	THIN WALL	900			X		100		1.880		
CANBERRA	2314	THIN WALL	900			X		100		3.050		
CANBERRA	2316	THIN WALL	900			X		100		3.950		
CANBERRA	2350	THIN WALL	900			X		120		8.150		
CANBERRA	2406	MINIATURE	550			X		11		19		
CANBERRA	2411	MINIATURE	575			X		15		54		
CANBERRA	2416	MINIATURE	575			X		28		420		
CANBERRA	2420	MINIATURE	500			X		10		4		
CANBERRA	2422	MINIATURE	460			X		10		1		
CANBERRA	2423	MINIATURE	550			X		10		1		
CANBERRA	JAN5979	MINIATURE	700	X	X	X		150		2.700		
CANBERRA	JAN7616	MINIATURE	760	X	X	X		75		600		
CANBERRA	P2121S	END WINDOW	900	X	X	X		100		1.700		

vedi sito http://www.canberra.com/products/438339.asp

Characteristics	T2411M	T2416A	T2417A	T2420M	T2422	3G70/ EM14752 3G70	4G60M/ EM14754 4G60M	4G2500/ EM14749 4G2500	3G6500/ EM14748 3G6500
Sensitivity*** 137Cs cpm at 1 mR/h*	84	420	450	04.02.00	01.06.00	04.02.00	04.02.00	150	270
Window Area Density (mg/cm2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Window Effective Diameter (mm, in.)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Recommended Operating Voltage (HV+)	575	575	575	500	460	460	500	550	460
Plateau Length Volts min.	500–650	500–650	500-650	450–550	450–550	420–500	450–550	500–600	420–500
Plateau Slope (%100 V max.)	15	8	8	35	40 max.	30	30	25	25
Dead Time (µs max.)	15	45	45	20	10	25	25	35	50
Background (cpm) Shielding 2” Pb + 1/8” Al	2 max.	12 max.	5 max.	6 typ.	0.6 typ.	0.6 max.	0.6 max.	6 max.	10 max.
Resistor Ra (MΩ)	2,2 M	4,7 M	4,7 M	4,7 M	4,7 M	4,7 M	4,7 M	4,7 M	4,7 M
Operating Temp. (°C)	–40 to +75	–40 to +75	–40 to +75	–51 to +71	–20 to +60	–20 to +60	–20 to +60	–20 to +60	–20 to +60
Cathode Material	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe	Cr/Fe
Cathode Wall	80–100 mg/cm2	64–80 mg/cm2	64–80 mg/cm2	360–400 mg/cm2	360–400 mg/cm2	360 mg/cm2	360 mg/cm2	260 mg/cm2	280 mg/cm2
Max. Overall Length including Pins (mm, in.)	37, 1.46	51, 2.0	46, 1.82	20, 0.8	20, 0.8	34, 2.91	20, 2.36	34, 2.91	54, 3.7
Max. Overall Diameter (mm, in.)	6.2, 0.244	10, 0.4	9.20, 0.36	7, 0.28	7, 0.28	7, 0.28	7, 0.28	7, 0.28	7, 0.28
Window Recess (mm, in.)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* An exposure of 115.07 mR in air equates to 1.0 mGy.
*** At recommended operating voltage.
The T2422 detector is equivalent to the 3G10.

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
CENTRONIC	B12H											
CENTRONIC	B12H/FL		370		X	X				5.600		
CENTRONIC	B6H		650		X	X				5.600		
CENTRONIC	B6TS		370		X	X				2.000		
CENTRONIC	C1300		500		X	X		7				
CENTRONIC	C300		500		X	X		11				
CENTRONIC	C301		500			X		7				
CENTRONIC	M2H											
CENTRONIC	M6H/100											
CENTRONIC	ZP1200	THIN WALL	500					90		19		
CENTRONIC	ZP1201		400			X		70				
CENTRONIC	ZP1202		400			X		110				
CENTRONIC	ZP1206		450			X		70				
CENTRONIC	ZP1210		400			X		200				
CENTRONIC	ZP1211/02		400			X		200				
CENTRONIC	ZP121221											
CENTRONIC	ZP1220		400			X		210				
CENTRONIC	ZP1220/01		400			X		210				
CENTRONIC	ZP1220/EC		400			X		210				
CENTRONIC	ZP1221		500			X		210				
CENTRONIC	ZP1221/01		400			X		210				
CENTRONIC	ZP1221/02		400			X		210				
CENTRONIC	ZP1300	THIN WALL	550					11		54		
CENTRONIC	ZP1301		500			X		13				
CENTRONIC	ZP1302		500			X		13				
CENTRONIC	ZP1304		500			X		13				
CENTRONIC	ZP1310	THIN WALL	575					15		3.950		
CENTRONIC	ZP1313		500			X		15				
CENTRONIC	ZP1314		500			X		15				
CENTRONIC	ZP1320		500		X	X		45				
CENTRONIC	ZP1320	THIN WALL	900					100		4		
CENTRONIC	ZP1321		500			X		55				
CENTRONIC	ZP1324		500			X		55				

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
CENTRONIC	ZP1352		600		X	X		200				
CENTRONIC	ZP1400	END WINDOW	500					90		1.200		
CENTRONIC	ZP1401	END WINDOW	500					90		1.200		
CENTRONIC	ZP1402		400	X	X	X		110				
CENTRONIC	ZP1405		400	X	X	X		110				
CENTRONIC	ZP1410	END WINDOW	575					100		1.200		
CENTRONIC	ZP1430		450	X	X	X		230				
CENTRONIC	ZP1431		500	X	X	X		230				
CENTRONIC	ZP1441		500	X	X	X		65				
CENTRONIC	ZP1442		500		X	X		65				
CENTRONIC	ZP1450	PANCAKE	900					90		1.500		
CENTRONIC	ZP1451		500	X	X	X		60				
CENTRONIC	ZP1452		400		X	X		60				
CENTRONIC	ZP1480		400	x	X	X		120				
CENTRONIC	ZP1481		450	X	X	X		120				
CENTRONIC	ZP1490		500			X		65				

vedi sito http://www.centronic.co.uk/standard_products.htm

	Sensitivity				Plateau			Counting Rate At	Dead Time	Back- Ground Shielded	Dose Rate Range
	Band			Length	Threshold	Length	Slope	10-2mGy/h	(µs)	(count/min.)	(mGy/h)
Type	α	β	γ	(mm)	(V) max.	(V)	(% /V) max.	(count/s) ♦	max.	max.	typical
ZP1200			•	40	400	200	0,04	28	90	10	10-3 – 102
ZP1206			•	14,5	450	100	0,1	11	70	9	1.5 x 10-3 – 2 x 102
ZP1210			•	140	400	100	0,15	110	200	70	3 x10-4 – 10
ZP1220			•	240	400	100	0,15	180	210	90	2 x10-4 – 3
ZP1220/EC *			•	240	400	100	0,15	180	210	90	2 x10-4 – 3
ZP1220/01			•	240	400	100	0,15	180	210	60	2 x10-4 – 3
With compensating filter											
ZP1221/01			•	240	400	100	0,15	180	210	60	2 x10-4 – 3
ZP1201			•	40	400	200	0,04	20	110	10	10-3 – 40
ZP1221			•	240	400	100	0,15	180	210	90	2 x10-4 – 3
ZP1301			•	7	500	100	0,3	340 ◊	13	1	10-1 – 1 x104
ZP1302			•	7	500	100	0,3	340 ◊	13	12 – 120	10-1 – 1 x104
ZP1313			•	16	500	150	0,15	1600 ◊	15	2	10-2 – 1 x103
ZP1321			•	28	500	150	0,08	9	55	12	3 x10-3 – 102
Ambient dose compensated											
ZP1202			•	40	400	200	0,04	20	110	10	10-3 – 40
ZP1211/02			•	140	400	100	0,15	110	200	60	3 x10-4 – 10
ZP1221/02			•	240	400	100	0,15	180	210	60	23 x10-4 – 3
ZP1304			•	7	500	100	0,3	340 ◊	13	1	10-1 – 1 x104
ZP1314			•	16	500	150	1,15	1600 ◊	15	2	10-2 – 1 x103
ZP1324			•	27	500	150	0,08	9	55	12	3 x 10-3 – 102
ZP1300		•	•	7	500	100	0,3	300◊	11	1	10-1 – 104
ZP1310		•	•	16	500	150	0,15	1600◊	15	2	2 x 10-2 – 4x103
ZP1320		•	•	28	500	150	0,08	9	45	12	3x10-3 – 2x102
ZP1352		•	•	120	400-600	200	0,01	85	200	35	3x10-4 – 10
ZP1400		•	•	9c	400	200	0,04	25	90	10	10-3 – 102
ZP1431		•	•	27.8a	450	250	0,04	44	230	25	6x10-4 – 6
ZP1442		•	•	19.8c	500	200	0,09	16	65	9	10-3 – 102
ZP1452		•	•	17.8c	500	250	0,07	29	60	25	10-3 – 20
ZP1480		•	•	17d	400	100	0,2	24	120	30	10-3 – 20
ZP1481	•	•	•	17d	400	100	0,2	24	120	30	10-3 – 20
ZP1401	•	•	•	9a	400	200	0,04	25	90	10	10-3 – 102
ZP1405	•	•	•	40	400	100	0,04	20	110	10	10-3 – 102

ZP1430	•	•	•	**27.8a**	**450**	**200**	**0,04**	**44**	**230**	**25**	**6 x10-4 – 6**
ZP1441	•	•	•	**19.8a**	**500**	**200**	**0,09**	**16**	**65**	**9**	**3 x10-3 – 102**
ZP1451	•	•	•	**27.8a**	**500**	**250**	**0,07**	**29**	**60**	**14**	**10-3 – 20**
ZP1490	•	•	•	**28a**	**450**	**250**	**0,06**	**29**	**65**	**15**	**10-3 – 20**
With compensating filter											
ZP1402	•	•	•	**9a**	**400**	**200**	**0,04**	**20**	**110**	**10**	**10-3 – 102**

	Sensitivity				**Plateau**						
	Band			**Length**	**Threshold**	**Length**	**Slope**	**Counting Rate At 10-2mGy/h**	**Dead Time**	**Back- Ground Shielded**	**Dose Rate Range**
Type	**α**	**β**	**γ**	**(mm)**	**(V)**	**(V)**	**(% /V)**	**(count/s) ♦**	**(µ2)**	**(count/min.)**	**(mGy/h)**
C300		•	•	**9**	**500**	**150**	**0,02**	**170◊**	**7**	**1**	**10-1 – 105**
C1300		•	•	**7**	**500**	**100**	**0,03**	**360◊**	**11**	**1**	**10-1 – 2 x 104**
With compensating filter											
C301			•	**9**	**500**	**150**	**0,02**	**140◊**	**7**	**1**	**10-1 – 105**

	Sensitivity												
	Band												
Type	**α**	**β**	**γ**	**Operating Voltage V**	**Min. Plateau Length V**	**Max. Slope % / V**	**Active Length mm**	**Life Expectation Counts**	**Sensitivity cpm/mR/hr**	**Shielded Background cpm**	**Liquid Capacity ml**	**Temp. Range °C**	**Temp. Coeff. V / °C**	**Wall / Window Density mg/cm2**
B6H		•	•	**370**	**100**	**0,15**	**64**	**1010**	**2000**	**15**	**-**	**-55 to +60**	**0,2**	**25 to 35**
B12H		•	•	**370**	**100**	**0,15**	**123**	**1010**	**5600**	**30**	**-**	**-55 to +60**	**0,2**	**25 to 35**
B12N		•	•	**675**	**120**	**0,1**	**120**	**1010**	**5000**	**30**	**-**	**-60 to +70**	**0,2**	**25 to 35**
B6T		•	•	**675**	**100**	**0,1**	**60**	**1010**	**-**	**-**	**-**	**-60 to +70**	**0,1**	**25 to 35**
With compensating filter														
B6TS			•	**675**	**100**	**0,1**	**60**	**1010**	**2700**	**-**	**-**	**-60 to +70**	**0,1**	**-**
Liquid Sampling														
M6H				**370**	**100**	**0,15**	**60**	**1010**	**-**	**16**	**9**	**-10 to +50**	**0,2**	**25 to 35**
M6H/100				**500**	**200**	**0,15**	**60**	**1010**	**2880**	**100**	**100**	**-10 to +50**	**0,2**	**25 to 35**
M2Na ,				**510**	**90**	**0,15**	**21**	**1010**	**-**	**20**	**3,5**	**-10 to +50**	**0,2**	**25 to 35**
M2H ,	**Liquid**			**370**	**100**	**0,15**	**20**	**1010**	**-**	**7**	**3,5**	**-55 to +60**	**0,2**	**25 to 35**

, = Supplied with waterproof rubber jacket
* = End connector
◊ = Counting rate at 10 mGy /h
♦ = 137Cs

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
EURISYS	3G10	MINIATURE	460					10		1		
EURISYS	4G15	MINIATURE	550					10				
EURISYS	4G60M	MINIATURE	500					10		1		
EX URSS	3043	PANCAKE	400	X	X	X				240		
EX URSS	BETA 1	PANCAKE	675			X				2.700		
EX URSS	BETA 2	PANCAKE										
EX URSS	BETA 2-2	PANCAKE										
EX URSS	BETA 2M1	PANCAKE										
EX URSS	BETA-1	PANCAKE			X					120		7,0
EX URSS	BETA1-1	PANCAKE			X					120		7,0
EX URSS	BETA-2	PANCAKE			X					200		15,0
EX URSS	BETA2-2	PANCAKE			X					200		15,0
EX URSS	BETA2M	PANCAKE				X				200		
EX URSS	BETA2M1	PANCAKE				X				200		
EX URSS	CBM20-1	HOT DOG			X	X				800		
EX URSS	CI8B	PANCAKE			X					400		30,0
EX URSS	CI8B1	PANCAKE			X					400		30,0
EX URSS	SPA-8	SCINTILLATOR	1.000			X		12		300K		
EX URSS	SBM-CBM 20	HOT DOG	400		X	X	10.2+07	190		780	22,0%	
Vacutronik	RAM 63-2	SCINTILLATOR	1.100		X	X	100+00	1				
Vacutronik	RAM 63-3	SCINTILLATOR	1.350	X			1.00+00	1				
F&H	FHZ 72	HOT DOG	450		X	X	2.25+01			1.200		
F&H	FHZ 73	HOT DOG	450		X	X	2.25+01			1.200		
F&H	FHZ 74	HOT DOG	450		X	X						
F&H	FHZ 76	HOT DOG	450		X	X						
F&H	FHZ 77A	END WINDOW	450	X	X	X						
G. & C.	XAI	END WINDOW	1.480	X	X	X		50				
JOHNSON	GP200	END WINDOW	900	X	X	X		150		2.500		9,1
JOHNSON	HP 265	SCINTILLATOR	900	X	X	X		5		60.000		14,0
JOHNSON	PPA-2T	PANCAKE	900	X	X	X				2.500		14,0

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
LND	712	END WINDOW	500	X	X	X		90		1.200		
LND	713	MINIATURE	575					28		420		
LND	714	MINIATURE	575					15		54		
LND	716	MINIATURE	550					11		19		
LND	719	THIN WALL	900					100		5.275		
LND	720	THIN WALL	900		X	X		100		635		
LND	721	THIN WALL	900					95		2.900		
LND	722	END WINDOW	900	X	X	X		150		2.700		
LND	723	END WINDOW	900	X	X	X		200		1.650		
LND	725	THIN WALL	900					150		1.550		
LND	743	THIN WALL	900					100		3.950		
LND	6306	HOT DOG	900		X	X						
LND	7224	END WINDOW	575	X	X	X		100		1.700		
LND	7231	PANCAKE	900	X	X	X		90		1.500		
LND	7232	END WINDOW	900	X	X	X		200		1.650		
LND	7311	PANCAKE	900	X	X	X		50		3.500		
LND	7802	THIN WALL	900					120		8.150		
LND	72314	END WINDOW										
LND	72610	THIN WALL	900					20		175		
LND	73118	PANCAKE	900	X	X	X		90		3.500		
LND	78017	THIN WALL	900					120		8.150		

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
LUDLUM	133-2	ALOGEN	550			X		80		1.000		15,0
LUDLUM	133-4	ALOGEN	550			X		80		100		15,0
LUDLUM	133-6	ALOGEN	550			X		50		30		15,0
LUDLUM	133-7	ALOGEN	460			X		50		4		15,0
LUDLUM	133-8	ALOGEN	460			X		50		1		25,0
LUDLUM	43-1	SCINTILLATOR	1.200	X					35,0%			83,0
LUDLUM	43-1-1	SCINTILLATOR	1.200	X	X				35,0%			83,0
LUDLUM	43-2	SCINTILLATOR	1.200	X					30,0%			15,0
LUDLUM	43-20			X	X							
LUDLUM	43-2-2	SCINTILLATOR	1.200	X	X							12,0
LUDLUM	43-40-2	SCINTILLATOR										
LUDLUM	43-40-3											
LUDLUM	43-44	AIR PROPORZ.	2.050	X								76,0
LUDLUM	43-44-1	AIR PROPORZ.	2.050	X					8,0%			76,0
LUDLUM	43-5	SCINTILLATOR	1.200	X					13,0%			65,3
LUDLUM	43-65	SCINTILLATOR	1.200	X					17,0%			63,0
LUDLUM	43-68		900	X	X				15,0%			15,0
LUDLUM	43-89	SCINTILLATOR	1.200	X	X							100,0
LUDLUM	43-90	SCINTILLATOR	1.200	X								100,0
LUDLUM	43-92	SCINTILLATOR	1.200	X					20,0%			100,0
LUDLUM	43-93	SCINTILLATOR	1.200	X					20,0%			100,0
LUDLUM	44-1	SCINTILLATOR	1.200		X							11,6
LUDLUM	44-10	SCINTILLATOR	1.200			X				900		
LUDLUM	44-11	SCINTILLATOR	1.200			X				900		
LUDLUM	44-110	TRITIUM DET.	1.700		X							126,0
LUDLUM	44-116	SCINTILLATOR	1.200		x							125,0
LUDLUM	44-142	SCINTILLATOR	1.200		x							100,0
LUDLUM	44-17	SCINTILLATOR	1.200			X				140		
LUDLUM	44-172											
LUDLUM	44-2	SCINTILLATOR	900			X			13,0%	175		4,9
LUDLUM	44-20	SCINTILLATOR	1.200			X				2.300		125,0
LUDLUM	44-21	SCINTILLATOR			X	X						

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
LUDLUM	44-25	PANCAKE	900	X	X	X				3.300		
LUDLUM	44-26	PANCAKE	900	X	X	X				9.900		
LUDLUM	44-3	SCINTILLATOR	900			X				675		5,0
LUDLUM	44-38	COMPENSATE			X	X						
LUDLUM	44-40	PANCAKE	900		X	X				3.300		
LUDLUM	44-40-2	PANCAKE	900	X	X	X				3.300		
LUDLUM	44-6	SIDEWALL	900		X	X		95		1.200		15,5
LUDLUM	44-62	SCINTILLATOR	1.200			X				66		
LUDLUM	44-7	END WINDOW	900	X	X	X				2.100		
LUDLUM	44-89	PANCAKE	900	X	X	X				12K		63,0
LUDLUM	44-9	PANCAKE	900	X	X	X	19.8-07	80	15,0%	3.300		15,0
LUDLUM	44-9-18	PANCAKE	900	X	X	X	19,8-07	80	15,0%	3.300		15,0
LUDLUM	44-92	GAS XENON			X	X						140,0
LUDLUM	44-94	PANCAKE	900	X	X	X				12K		
LUDLUM	44-98	SCINTILLATOR			X							11,8

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
MILITARY	5979	END WINDOW	900	X	X	X		150		2.700		
MILITARY	7616	END WINDOW	900	X	X	X		70		500		
MILITARY	8767	PANCAKE	900	X	X	X		50		3.500		
MILITARY	JAN5979	END WINDOW	900	X	X	X		150		2.700		
MILITARY	JAN7616	END WINDOW	900	X	X	X		70		500		
ROTEM	2147	PANCAKE	875	X	X	X				3.500		
ROTEM	GM-10	PANCAKE	875	X	X	X	21+07			3.500		
ROTEM	GM-40	SCINTILLATOR	875			X						
ROTEM	GM-41	SCINTILLATOR	875			X						
ROTEM	GM-42	SCINTILLATOR	875			X						
ROTEM	IC-10	IONIZZ.	875			X						
ROTEM	PA-100	IONIZZ.	875	X					2.650			100,0
ROTEM	PM-10	SCINTILLATOR	875			X						
ROTEM	PM-11	SCINTILLATOR	875			X						

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
SAINT-GOB.	803	MINIATURE	575		X	X		28		475		
SAINT-GOB.	1504	MINIATURE	500			X		90		1.400		
SAINT-GOB.	1504-1	MINIATURE	500			X		110		1.400		
SAINT-GOB.	1611-PT	HIGH-SENSIB.	900			X		100		5.000		
SAINT-GOB.	1620-PT	HIGH-SENSIB.	700			X		100		8.500		
SAINT-GOB.	1625-PT	HIGH-SENSIB.	950			X		100		12.850		
SAINT-GOB.	1915-PT	HIGH-SENSIB.	900			X		150		5.800		
SAINT-GOB.	1916-PT	HIGH-SENSIB.	1.000			X		150		6.350		
SAINT-GOB.	3304-W	END WINDOW	575	X	X	X		175		1.700		
SAINT-GOB.	50CM2		900	X	X	X		100		13.400		
SAINT-GOB.	G1200	CYLINDRICAL	500			X		90		1.400		
SAINT-GOB.	G1210	CYLINDRICAL	450			X		200		5.200		
SAINT-GOB.	G1220	CYLINDRICAL	450			X		210		9.000		
SAINT-GOB.	G1221-2	HIGH-SENSIB.	450			X		210		9.000		
SAINT-GOB.	G1300	MINIATURE	550		X	X		11		19		
SAINT-GOB.	G1301	MINIATURE	550			X		13		16		
SAINT-GOB.	G1310	MINIATURE	575		X	X		15		85		
SAINT-GOB.	G1313	MINIATURE	575			X		15		85		
SAINT-GOB.	G1321	MINIATURE	575			X		55		475		
SAINT-GOB.	G1421	END WINDOW	575	X	X	X		230		2.300		
SAINT-GOB.	G1452		500	X	X	X		100		1.700		
SAINT-GOB.	N1004		500	X	X	X		60		1.500		
SAINT-GOB.	N1005	END WINDOW	900	X	X	X		100		3.350		
SAINT-GOB.	N1008		900	X	X	X		100		3.350		
SAINT-GOB.	N106-3P	CYLINDRICAL	900		X	X		100		2.200		
SAINT-GOB.	N107-3P	CYLINDRICAL	900		X	X		100		5.200		
SAINT-GOB.	N108-3P	CYLINDRICAL	900		X	X		100		3.300		
SAINT-GOB.	N112	CYLINDRICAL	900		X	X		150		1.500		
SAINT-GOB.	N112HS	CYLINDRICAL	900		X	X		150		2.000		
SAINT-GOB.	N112X	CYLINDRICAL	900		X	X		150		1.100		
SAINT-GOB.	N114	CYLINDRICAL	900		X	X		100		800		
SAINT-GOB.	N302	MINIATURE	900			X		20		125		
SAINT-GOB.	N309-3P	CYLINDRICAL	900			X		100		2.200		
SAINT-GOB.	N310-3P	CYLINDRICAL	900			X		100		4.700		

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT uS	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
SAINT-GOB.	N358-9,1	HIGH-SENSIB.	950			X		100		12.850		
SAINT-GOB.	N3785		450		X	X		200		8.500		
SAINT-GOB.	N378S	HIGH-SENSIB.	450			X		200		9.000		
SAINT-GOB.	NP334-6	HIGH-SENSIB.	900			X		150		5.800		
SAINT-GOB.	NP334-6,6	HIGH-SENSIB.	1.000			X		150		6.350		
SAINT-GOB.	NP334-8	HIGH-SENSIB.	900			X		100		8.500		
SAINT-GOB.	NP358-1,8	HIGH-SENSIB.	700			X		100		2.600		
SAINT-GOB.	NP358-6	HIGH-SENSIB.	700			X		100		5.500		
SAINT-GOB.	NP358-8	HIGH-SENSIB.	700			X		100		8.500		

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
TGM	5368		450			X						
TGM	MC71		450			X						
TGM	N1002	PANCAKE	900	X	X	X		50		3.500		
TGM	N1002-1	PANCAKE	900	X	X	X		50				
TGM	N1004	PANCAKE	900					90		1.500		
TGM	N1006	PANCAKE	900					70		500		
TGM	N106	THIN WALL	900					75		2.900		
TGM	N107	THIN WALL	900					100		5.275		
TGM	N112	THIN WALL	900					150		1.550		
TGM	N114	THIN WALL	900					90		635		
TGM	N115-1	THIN WALL	550					11		19		
TGM	N116-1	THIN WALL	575					15		54		
TGM	N117-1	THIN WALL	575					28		420		
TGM	N119	THIN WALL	900					150		4.800		
TGM	N201	END WINDOW	900					150		2.700		
TGM	N202	END WINDOW	750					50		50		
TGM	N204	END WINDOW	900									
TGM	N204/MHV	END WINDOW										
TGM	N205	END WINDOW	500					90		1.200		
TGM	N206	END WINDOW	575					100		1.700		
TGM	N210	END WINDOW	900					200		1.650		
TGM	N210/BNC	END WINDOW	900					200		1.650		
TGM	N305	THIN WALL	500					90		1.200		
TGM	N309	THIN WALL	900					100		1.880		
TGM	N310	THIN WALL	900					100		3.950		
TGM	N320	THIN WALL	900					100		950		

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
THERMO	44-88	END WINDOW	900	X	X	X				3.300		
THERMO	A50L	SCINTILLATOR		X								0,6
THERMO	AC 3-7	SCINTILLATOR	1.000	X				6				0,5
THERMO	AC 3-8	SCINTILLATOR	1.000	X				6				0,5
THERMO	AP2/4A	SCINTILLATOR		X								0,5
THERMO	AP4/4A	SCINTILLATOR		X								0,2
THERMO	AP5AD	SCINTILLATOR		X								0,5
THERMO	AP5RA	SCINTILLATOR		X								1,0
THERMO	AP6A	SCINTILLATOR		X								6,0
THERMO	BP19AD	SCINTILLATOR			X					3.000		100,0
THERMO	BP7/4C	SCINTILLATOR			X					1.500		1,4
THERMO	BP1/4A	SCINTILLATOR			X					1.800		1,4
THERMO	BP13A	SCINTILLATOR			X							80,0
THERMO	BP17A	SCINTILLATOR			X							600,0
THERMO	BP19DD	SCINTILLATOR			X					3.000		100,0
THERMO	BP4/4A	SCINTILLATOR			X					1.500		20,0
THERMO	BP4/4C	SCINTILLATOR			X					1.500		20,0
THERMO	BP7/4A	SCINTILLATOR			X							80,0
THERMO	DP2/4A	SCINTILLATOR		X								600,0
THERMO	DP2R/4A	SCINTILLATOR		X	X							50,0
THERMO	DP6AD	SCINTILLATOR		X	X							100,0
THERMO	DP8A	SCINTILLATOR		X	X							600,0
THERMO	GP20B/R	END WINDOW	450			X						
THERMO	GP21B/R	END WINDOW	500			X						
THERMO	HP 100 CGS	GAS P10	1.800	X	X							
THERMO	HP 190-01	END WINDOW	900	X	X	X		200	6,0%	3	10,0%	
THERMO	HP 190A	END WINDOW	900	X	X	X	1+00	200		2.500		
THERMO	HP 210	PANCAKE	900	X	X	X	1+00	80	25,0%	3.600	16,0%	15,5
THERMO	HP 220A	PANCAKE	600	X	X	X						
THERMO	HP 260											
THERMO	HP 270	PANCAKE	900		X	X	7.2+07	112		1.200		
THERMO	HP 280											
THERMO	HP 290	PANCAKE	550		X	X	7.2+07	120		1.200		
THERMO	HP 300	GM										

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
THERMO	HP 360	PANCAKE	900	X	X	X	21.6+07	50		3.600	16,0%	15,5
THERMO	HP 380 AB	PANCAKE	900		X	X				1.200		
THERMO	HP 380A	PANCAKE	600	X					21,0%			100,0
THERMO	HP 380B		900		X					1.200		
THERMO	HP 100CGS	GAS P10		X	X	X						
THERMO	HP 220							100		19		
THERMO	HP 220A		600			X	1,55+06	60				1,0
THERMO	HP 230A		900		X	X						
THERMO	HP 260	PANCAKE	500		X	X		80		3.600		
THERMO	HP 280											
THERMO	HP 330	PANCAKE	1.550	X	X	X						
THERMO	HP 340											
THERMO	HP 350											
THERMO	HP 370	PANCAKE	1.750	X	X	X						
THERMO	IGP24A/SV		550							137		
THERMO	LEG-1	SCINTILLATOR	1.000			X	100+00	12		60		
THERMO	NRD	PROPORZ	1.850			X	300+06	10				
THERMO	PG-2		1.000			X				60K		
THERMO	PGM/ECPCM	PANCAKE	900					50		3.600		15,5
THERMO	RCM-1		1.200				2,80-01	13				
THERMO	RD-14			X	X							
THERMO	SAC-R5		800									
THERMO	SPA-1A		650	X			3,10-01	10				
THERMO	SPA-3	SCINTILLATOR	1.000			X		14		1200K		
THERMO	SPA-6	SCINTILLATOR	1.000			X		14		600K		
THERMO	SPA-9	SCINTILLATOR	1.000			X		12		400K		
THERMO	SW/GM		900					100		1.600		
THERMO	WAM-4		1.000			X	1,76-01	13				

PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2	R	pF
VALVO	18500	AR	1050			x		75						2,0
VALVO	18501	AR	1050			x		75						2,0
VALVO	18502		350		x	x		150						2,0
VALVO	18503	Ne Ar ALO	450			x		100					10M	2,0
VALVO	18504	Ne Ar ALO	450	x	x	x		100				63,5	10M	2,0
VALVO	18505	Ne Ar ALO	450	x	x	x		125				3,0	10M	2,0
VALVO	18506	Ne Ar ALO	475	x	x	x		225				6,0	10M	3,5
VALVO	18509-02	Ne Ar ALO	550		x	x		30					2M	1,0
VALVO	18509	Ne Ar ALO	550		x	x		60					10M	1,0
VALVO	18510	Ne Ar ALO	450		x			125					5M	4,0
VALVO	18511	XE	1500			x								2,0
VALVO	18513	rare gas	575	x	x			60				31,7		1,5
VALVO	18514	rare gas	600	x	x			250				605,0		1,5
VALVO	18515	Ne Ar ALO	575		x			150				3,1	10M	1,5
VALVO	18516	Ne Ar ALO	575		x			40				6,1	5M	1,3
VALVO	18517	ALO	1000					1					10M	5,5
VALVO	18518	ALO	1000					1					10M	8,0
VALVO	18519	Ne Ar ALO	450			x		35					4,7M	2,2
VALVO	18520	Ne Ar ALO	375			x		60					4,7M	4,5
VALVO	18523	Ne Ar ALO	600			x		70				455,0	4,7M	3,0
VALVO	18524-01	Ne Ar ALO	400		x	x		100				10,0	4,7M	2,5
VALVO	18526	Ne Ar ALO	450	x	x	x		200				6,1	10M	3,5
VALVO	18529	Ne Ar ALO	400			x							2M	0,5
VALVO	18533	Ne Ar ALO	400		x	x		100					4,7M	2,5
VALVO	18536	Ne Ar ALO	500	x	x	x		40				6,1	5M	1,3
VALVO	18537	Ar ALO	1000			x		150				3,1	4,7M	2,7
VALVO	18538	Kr ALO	1000			x		400				3,1	4,7M	2,7
VALVO	18545	Ne Ar ALO	500			x		200					4,7M	10,0
VALVO	18546	Ne Ar ALO	900		x			45					4,7M	5,0
VALVO	18550	Ne Ar ALO	500		x	x		50					5M	1,1
VALVO	18552	Ne Ar ALO	600		x	x		70					2M	4,0

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TYPE	Sensitivity Band α	Band β	Band γ	max.Length (mm)	Dose-Rate-Range (µSv/h / µGy/h) [2]	Counting Rate [^{137}Cs] at 1 µGy/h (counts/s)	Dead-time (µs)	Background shielded [3] (counts/min)	Plateau Range (V)	Plateau Slope (%/100V)
70 003		•	•	43	1 ... 10^5	2.2	≤ 120	≤ 20	400 ... 600	8
70 003 A/E [1]			•	45	1 ... 10^5	2.6	≤ 120	≤ 8	400 ... 600	8
70 013			•	170	0.3 ... 10^4	10	≤ 100	≤ 60	400 ... 600	10
70 013 A/E [1]			•	167	0.3 ... 10^4	7.5	≤ 100	≤ 60	400 ... 600	10
70 015		•	•	35	10^2 ... 10^7	0.04	≤ 13	≤ 1	500 ... 600	30
70 015 A/E [1]			•	35	10^2 ... 10^7	0.04	≤ 13	≤ 1	500 ... 600	30
70 016		•	•	37	10 ... $4x10^6$	0.16	≤ 15	≤ 2	500 ... 650	15
70 016 A/E [1]			•	35	10 ... $4x10^6$	0.16	≤ 15	≤ 2	500 ... 650	15
70 017		•	•	57	2 ... $3x10^5$	0.73	≤ 25	≤ 5	400 ... 550	10
70 017 A/E [1]			•	59	2 ... $3x10^5$	0.72	≤ 25	≤ 5	400 ... 550	10
70 018			•	43	10^2 ... $2x10^7$	0.02	≤ 20	≤ 2	520 ... 620	30
70 018 A/E [1]			•	55	10^2 ... $2x10^7$	0.02	≤ 20	≤ 2	520 ... 620	30
70 019		•	•	49	1 ... $5x10^4$	2.1	≤ 60	≤ 7	400 ... 600	4
70 019 A/E [1]			•	51	1 ... $5x10^4$	1.7	≤ 60	≤ 7	400 ... 600	4
70 030			•	45	1 ... 10^5	2.5	≤ 65	≤ 20	400 ... 600	8
70 030 A/E [1]			•	45	1 ... 10^5	1.5	≤ 65	≤ 8	400 ... 600	8
70 031			•	300	0.2 ... $3x10^3$	16	≤ 150	≤ 120	400 ... 600	10
70 031 A/E [1]			•	300	0.2 ... $3x10^3$	18	≤ 150	≤ 100	400 ... 600	10
70 035		•	•	109	0.3 ... $3x10^4$	5.5	≤ 100	≤ 50	400 ... 550	8

End-window	Energy Range α (MeV)	Energy Range β (keV)	Energy Range X (keV)	Window Ø (mm)	Window Thickness (mg/cm^2)	Window Material	Dead-time (µs)	Background shielded [3] (counts/min)	Plateau Range (V)	Plateau Slope (%/100V)
70 071	3.5	50	3	18	1.5 ... 2	Mica	≤ 120	5	420 ... 650	5
70 072	3.5	50	3	13	1.5 ... 2	Mica	≤ 90	7	400 ... 600	4
70 074	3.5	50	3	36	1.5 ... 2	Mica	≤ 120	24	420 ... 650	3
70 075	3.5	50	3	45	1.5 ... 2	Mica	≤ 30	24	850...1050	10

[1] with compensation filter: A=Ambient Dose Equivalent (H*10), E=Air Kerma/Exposure

[2] A in [µSv/h], E in [µGy/h] ; for the uncompensated types the range is given in dose rate unit at 662 keV [137Cs]

[3] shielded with 5cmPb+0.2cm Al

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PRODUCER	MODEL	PROBE	OPERATING VOLTAGE HV	α	β	γ	CC	DT us	α Pu 239 - 4P	β + γ cpm/mR/hr Cs137	γ Co60	PROBE AREA cm2
VICTOREN	301	HOT DOG	900		X	X		100		720		
VICTOREN	OCD-101	HOT DOG	900		X	X		100		720		
VICTOREN	OCDD-103	HOT DOG	900		X	X		100		720		

vedi sito www.lndinc.com > product > Cross Reference Chart to Other Mfg. Products

LND Type	Phillips Amperex	TGM Detectors	Centronics	Mullard	LND Type	Phillips Amperex	TGM Detectors	Centronics	Mullard
72314	18526	N/A	ZP1430	MX169	7103	N/A	NP322-2	N/A	N/A
72327	18506	N/A	ZP1431	MX149	720	N/A	N114	N/A	N/A
7311	N/A	N1002/8767	N/A	N/A	7242	18515	N/A	ZP1441	MX152
73118	18546	N1006	ZP1460	MX167	72412	N/A	N/A	ZP1442	N/A
743	N/A	N310/3P	N/A	N/A	712	N/A	N/A	ZP1401	N/A
719	N/A	N107/3P	ZP1860	N/A	7121	18503	N/A	ZP1200	MX146
72514	N/A	N/A	B12N	N/A	7124	18504	N205	ZP1400	MX147
78016	18520	N/A	ZP1210	MX120	7128	N/A	N/A	ZP1201	N/A
7807	N/A	N/A	ZP1221	N/A	72310	N/A	N1003	N/A	N/A
78017	18545	N/A	ZP1220	MX145	725	N/A	N112	N/A	N/A
72511	N/A	N/A	B12C	N/A	7231	18536	N/A	ZP1490	MX166
71322	N/A	N117-1S/C1321	ZP1321	N/A	72315	18516	N/A	ZP1452	N/A
7256	N/A	NP334-6	N/A	N/A	72216	N/A	N/A	ZP1470	MX123
716	18529	N115-1/C1300	ZP1300	MX163	7224	18505	N/A	ZP1410	MX148
7165	N/A	N115-1S1/C1301	ZP1301	N/A	723	N/A	N210-1	N/A	N/A
7437	N/A	NP358-9.1	N/A	N/A	7232	N/A	N210/BNC	N/A	N/A
714	18509	N116-1/C1310	ZP1310	MX151	721	N/A	N106/3P	ZP1850	N/A
45697	18511	N/A	ZP1610	MX161	72118	18555	N/A	ZP1330	MX177
7149	N/A	N/A	ZP1313	N/A	72219	18507	N/A	ZP1600	MX159
71412	N/A	N116-1SE/C1312	ZP1311	MX189	72231	N/A	N201	N/A	N/A
72611	N/A	N302	N/A	N/A	72233	N/A	N/A	ZP1481	MX168
78034	N/A	N378/BNC	N/A	N/A	740501	N/A	NP315-4	ZP1810	N/A
713	18550	N117-1/C1320	ZP1320	MX164	7436	N/A	NP358-5.75/3P	N/A	N/A
7133	N/A	N/A	M6H	N/A					
7139	N/A	N/A	ZP1324	N/A					
7102	N/A	N222	N/A	N/A					

vedi sito http://www.canberra.com/products/438339.asp

	CANBERRA	Centronics	LND	Saint Gobain
Min. Detectors	T2411	ZP1310	714	N116-1/C1310

vedi sito http://www.vacutec-gmbh.de > product > Geiger-Müller-Zählrohr Cross-Referenzliste

VacuTec	Centronics	Philips Amperex	LND	Mullard	TGM Detectors
70 003 70 003 E 70 003 A	ZP1200 ZP1201 ZP1202	18503	7121 71210	MX146	
70 013 70 013 E 70 013 A	ZP1210	18520	78016	MX120	
70 015 70 015 E 70 015 A	ZP1300 ZP1301 ZP1304	18529	716 7165	MX163	N115-1/C1300 N115-1S1/C1301
70 016 70 016 E 70 016 A	ZP1310 ZP1313 ZP1314	18509	714 7149	MX151	N116-1/C1310
70 017 70 017 E 70 017 A	ZP1320 ZP1321 ZP1324	18550	713 71322 7139	MX164	N117-1/C1320 N117-1S/C1321
70 019 70 019 E 70 019 A	ZP1200 ZP1201 ZP1202	18503	7121 71210	MX146	
70 031 70 031 E 70 031 A	ZP1220 ZP1221 ZP1221/02	18545	78017 7807	MX145	
70 071			7241		
70 072	ZP1400	18504	7124	MX147	
70 074	ZP1430	18526	72314	MX169	
70 075	ZP1460	18546	7312	MX167	

Vedi sito http://www.centronic.co.uk/geiger_muller_tubes_cross_reference.htm

ZP	185	MX	US
ZP1200	18503	MX146	
ZP1210	18520	MX120/01	
ZP1220	18545	MX145	
ZP1230*		MX180	
ZP1240*		MX119	
ZP1300	18529	MX163	
ZP1310	18509	MX151	
ZP1311*		MX189	
ZP1311*		ZP1100	
ZP1320	18550	MX164	
ZP1330	18555	MX177	
ZP1400	18504	MX147	
ZP1410	18505	MX148	
ZP1430	18526	MX169	
ZP1431	18506	MX149	
ZP1441	18515	MX152	
ZP1451	18536	MX166	
ZP1460*	18546/01	MX167/01	
ZP1470		MX123	
ZP1480		MX168/02	
ZP1481		MX168	
ZP1500*		ZP1083	
ZP1501*		ZP1080	
ZP1520*	18525	MX124-01	
ZP1530*		MX142	
ZP1550*		MX188	
ZP1600	18507	MX159	
ZP1610	18511	MX161	
ZP1700	18518	MX155	
ZP1800			171G
ZP1810*			181G2
ZP1820*			78L
ZP1830*			79L
ZP1840*			560N
ZP1850*			90NB3
ZP1860*			912NB3

*** Obsolete**

Una raccolta (non esaustiva) di siti WEB

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http://www.blackcatsystems.com/index.html
http://sourceforge.net/projects/cdvcounter/
http://www.anythingradioactive.com/CDVCounter/help.html
http://www.radprocalculator.com/Index.aspx
http://ea4eoz.ure.es/ugp.html

Satisfied users

http://radgoes.blogspot.com/

Thermo Radiometrie

1949	Founded by Mr. Fieseke and Mr. Hoepfner as Frieseke & Hoepfner GmbH, a company specialized in precision machinery, hydraulic tool equipment, radiation monitoring and industrial gauging technology.
1954	Acquired by the owner of FAG Kugelfischer, although the company still operated under the name of Frieseke und Hoepfner GmbH, continuing to manufacture practically the same product range.
1981	Integrated as 3 product divisions, Hydraulic & Control, Radiation Monitoring and Radiometrie into FAG Kugelfischer, a cooperaton with 38,000 employees.
1986	In March the Radiometrie division acquired Daystorm (Gloucester, England) and Nucleometre (Sarcelles, France) from Schlumberger and formed the largest gauging company in Europe.
1993	**Thermo Instrument Systems acquired Radiometrie as of Nov. 1, 1993. In 1994, Eberline Instrument GmbH was formed.**
1996	Thermo Instrument Systems spun out its divisions Eberline Radiometrie and Gamma Metrics to form Metrika Systems Corporation.
1998	Metrika Systems Corporation acquired the metals gauging division of Honeywell-Measurex, forming Radiometrie, the world's largest gauging company with three plants in Germany, U.K. and USA.

LUDLUM MEASUREMENTS, INC

http://www.ludlums.com/images/stories/news_letters/Don%20Ludlum%20Story.pdf

CENTRONIC

http://www.centronic.co.uk/history.htm

Founded in 1945 by Gilbert Tomes and Alec Tidmarsh, Centronic, or 20th Century Electronics as it was then known, started life in the back bedroom of Gilbert Tomes' house in Kent, England.

His work on electron tubes within the television industry and his interest in radiation detection led to the creation of 20th Century Electronics for the commercial development and manufacture of cathode ray and Geiger-Müller tubes. He became sole owner of the company in 1949 when it became a limited company, 20th Century Electronics Limited. By concentrating on chosen specialities of radiation detection and optical sensing, the company grew rapidly to become a world leader in its area of expertise, with many cutting edge innovations arising on the way. With over 50 years experience in meeting the challenge of change, the company continues to be as much as ever a "hive of activity".

Saint-Gobain Crystals is an operating unit of Compagnie de Saint-Gobain, which is based in Paris, France.

Saint-Gobain was created in 1665 by Louis XIV's Minister of Finance, Jean-Baptiste Colbert, to break Venice's monopoly over the glass trade. Saint-Gobain supplied the mirrors for the Hall of Mirrors in the Palace of Versailles in 1684.
Has been established since: 1853 in Germany, 1889 in Italy, 1904 in Spain and Benelux, 1937 in Brazil, 1967 in the United States.

The Foundation of Saint-Gobain Crystals, Scintillation Products

1930's	Harshaw Chemical Company is the first major manufacturer to develop and produce scintillation crystals.
1940's	Quartz & Silice, a subsidiary of Saint-Gobain, begins production of optical crystals and scintillation crystals.
1969	Bicron Corporation is established and begins production of NaI(Tl) scintillation ingots.
1990	Saint-Gobain acquires Bicron Corporation and Harshaw brand products from Engelhard.
1992	Crismatec-Grenoble is acquired. Crismatec becomes the new name for the Quartz & Silice entity.
1997	Bicron Products Private Limited (BPPL) production facility is opened in Bangalore, Karnataka, India
1999	Bicron acquires TGM Detectors and Gamma Laboratories.
2000	All of the above businesses and brand names are united under the Saint-Gobain name.
2002	Bicron Radiation Measurement and Protection division is sold to Thermo Electron.
2003	Introduction of new scintillation crystals Lanthanum Chloride, Lanthanum Bromide and LYSO, which are later, marketed under the BrilLanCe and PreLude trademarks.
2008	Saint-Gobain Crystals headquarters and Scintillation manufacturing operations move to new facility in Hiram, Ohio.

http://www.detectors.saint-gobain.com/History.aspx