



Victoreen Geiger-Mueller and Scintillation Probe Selection Guide



GM probes for qualitative radiation detection

Scintillation probes for quantitative radiation assessment

All probes are direct read when married with Victoreen Models 190 and 290 meters

INTRODUCTION

Victoreen Geiger-Mueller (GM) detectors fulfill a wide variety of radiation measurement needs.

Probes are available for detection of alpha, beta, and gamma radiation. Some probes are provided with a 360° shield to permit discrimination between penetrating and non-penetrating radiation.

Reliability and ruggedness are built into Victoreen GM detectors, with uniformity of construction and field-proven design to assure dependable performance with all Victoreen GM survey instruments.

Scintillation Probes Specifications

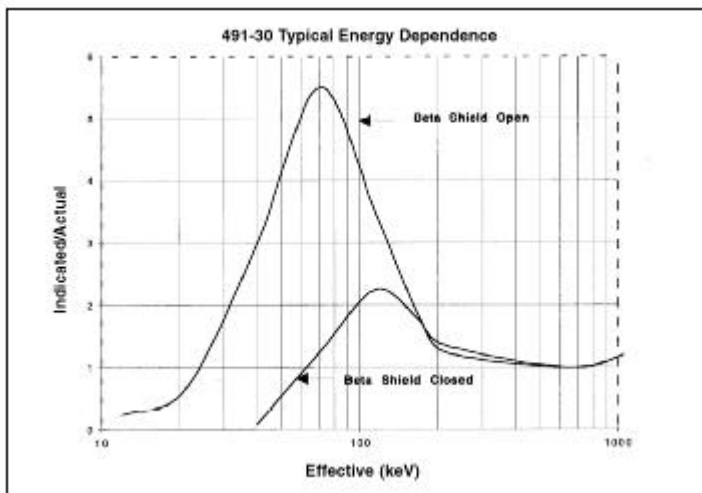
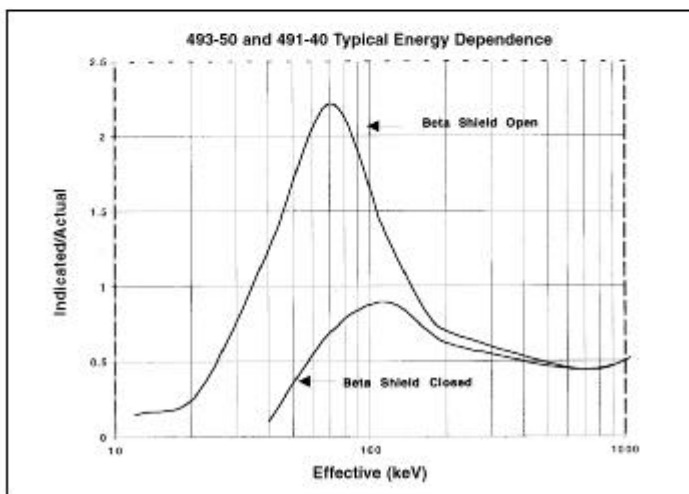
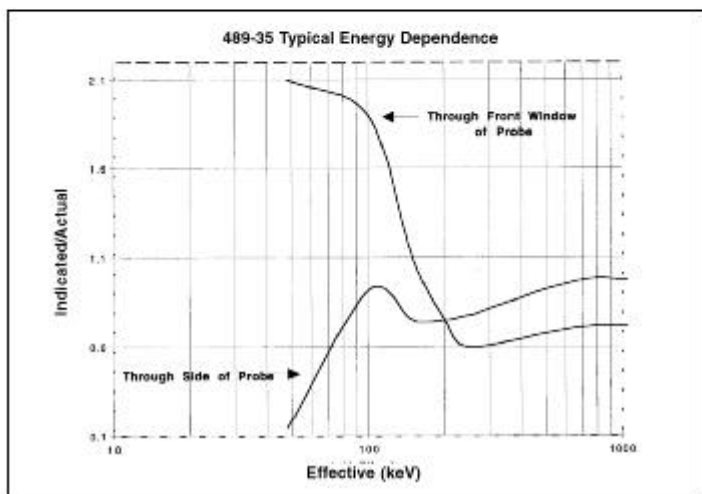
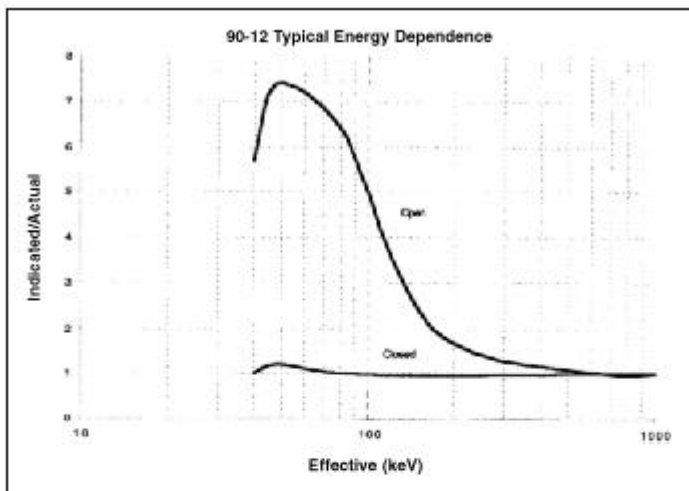
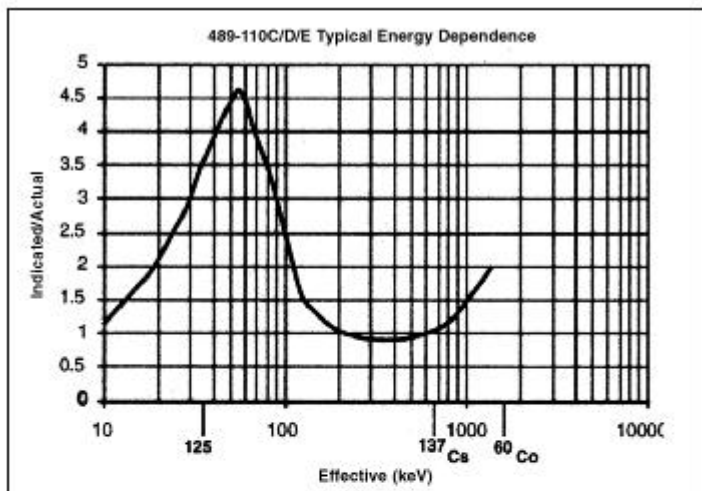
Model Number	489-50	489-55	489-120	489-60	425-110	425-200	489-200
Type	Nal (TI) Sodium Iodine 1x1, Scintillator optically coupled to PMT	Nal (TI) Sodium Iodine 1¼ x1½, Scintillator optically coupled to PMT	Nal (TI) Sodium Iodine 2 x 2, Scintillator optically coupled to PMT	ZnS (Ag) Alpha Scintillator optically coupled to PMT	Nal (TI) Thin Scintillator for low energy Gamma, Scintillator optically coupled to PMT	NE 102A Plastic Scintillator Flashlight Probe, Scintillator optically coupled to PMT	Nal (TI) Pancake Scintillator optically coupled to PMT
Radiation Detected	Gamma and X-ray above 60 keV	Gamma and X-ray above 60 keV	Gamma and X-ray above 60 keV	Alpha above 4 MeV	Gamma and X-ray above 10 keV	Alpha above 350 keV, beta above 14 keV	Gamma and X-ray above 25 keV, beta above 100 keV
Applications	<ul style="list-style-type: none"> • Nuclear medicine • Industrial hygiene • Industrial X-ray manufacturing • Geological surveys • Radiation safety office 	<ul style="list-style-type: none"> • Nuclear medicine • Industrial hygiene • Industrial X-ray manufacturing • Geological surveys • Radiation safety office 	<ul style="list-style-type: none"> • Nuclear medicine seed finder 	<ul style="list-style-type: none"> • Alpha detection Uranium, Plutonium • HAZMAT • RSO 	<ul style="list-style-type: none"> • Primary probe for nuclear medicine • Low energy X-ray manufacturing • Industrial hygiene 	<ul style="list-style-type: none"> • Alpha, beta counting of filter paper • HAZMAT spills • Nuclear medicine missing sources 	<ul style="list-style-type: none"> • Beta, gamma frisker for nuclear medicine is 10 times more sensitive than GM probe • Environmental surveys
Typical Background (CPM)	1750	5000	6000	20	200	38	3000
Nominal Sensitivity	160,000 cpm/mR/hr Cs 137	350,000 cpm/mR/hr Cs 137	700,000 cpm/mR/hr Cs 137	300,000 cpm/µCi Am 241	3,000,000 cpm/µCi I 129	0.0012 cpm/dpm/10 cm ² Ni63	650 cpm/µR/hr Cs137
Wall Material	0.04 in Al, 1 mm thick	0.04 in Al, 1 mm thick	0.04 in Al, 1 mm thick	0.04 in Al, 1 mm thick	0.04 in Al, 1 mm thick	0.04 in Al, 1 mm thick	0.04 in Al, 1 mm thick
Window	108 mg/cm ² Al	108 mg/cm ² Al	108 mg/cm ² Al	3 mg/cm ² Al Mylar	8 mg/cm ² Al	0.25 mg/cm ² Plastic	130 mg/cm ² Al
Sensitive Area	5 cm ²	10 cm ²	20 cm ²	11.4 cm ²	5 cm ²	20.3 cm ²	59.2 cm ²
Crystal Dim.	1 in x 1 in	1.25 in x 1.5 in	2 in x 2 in	1.5 in Ø	1 in Ø	2 in Ø	2 in x 2 in x ½ in
Probe Diameter	2 in	2 in	2.25 in	2 in	2 in	2.625 in	2.25 in x .69 in
Probe Length	8.75 in	9.125 in	9.625 in	7.25 in	8.125 in	8 in	11 in
Cable Length	48 in	48 in	48 in	48 in	48 in	48 in	48 in
Operating Voltage	900 V	900 V	900 V	900 V	900 V	900 V	900 V
Calibration	Cs137 2 pts/scale to 10 mR/hr	Cs137 2 pts/scale to 100 mR/hr	Cs137 2 pts/scale to 10 mR/hr	Sensitivity to Am241	Sensitivity to I 129	Sensitivity to Sr90 Tc99 Cs137 C14	137 Cs 2 pts/scale to 10 mR/hr
Cal. Tolerance	± 10%	± 10%	± 10%	± 10%	± 10%	± 10%	± 10%
Efficiency	Cs137 6% Co57 9% Ba133 6% Co60 2%	Cs137 13%	C137s 26%	Pu 239 13% A241m 8%	Sr 90 22% Cl 36 8% Am 241 8% Ba133 34%	Sr90 7% Tc99 3% Cs137 5% C14 1%	SR90 5% Cs137 11% Ba133 34% Co60 16%
Humidity Range	0-95%	0-95%	0-95%	0-95%	0-95%	0-95%	0-95%
Operating Temp	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr	- 40°F to + 120°F - 40°C to + 50°C Max. temp increase of 20°F/hr
Weight (Approx.)	1.5 lb (0.68 kg)	1.5 lb (0.68 kg)	2.0 lb (0.91 kg)	1.5 lb (0.68 kg)	1.5 lb (0.68 kg)	.78 lb (0.35kg)	.78 lb (0.35kg)

Geiger-Mueller Probes Specifications

Model Number	489-110C/D/E*	90-12	489-35	493-50	491-40	491-30
Type	Pancake alpha, beta, gamma, and X-ray with thin pancake window	Energy compensated beta, gamma, and X-ray with 360° linear movement shield for beta discrimination	Alpha, beta, gamma, and X-ray with 7/8 inch thin end window	Beta, gamma, and X-ray with sliding 360° metal shield for beta discrimination	Beta, gamma, and X-ray with sliding 360° metal shield for Beta discrimination	Beta, gamma, and X-ray with sliding 360° metal shield for beta discrimination
Radiation Detected	Alpha above 3.5 MeV, beta above 35 keV, gamma and X-ray above 6 keV	Beta above 200 keV and gamma above 12 keV	Alpha above 4 MeV, beta above 70 keV, and gamma and X-ray above 6 keV	Gamma above 12 keV and beta above 200 keV	Gamma above 12 keV and beta above 200 keV	Gamma above 12 keV and beta above 200 keV
Applications	<ul style="list-style-type: none"> • All purpose sensitive alpha, beta, and gamma and X-ray probe • Nuclear medicine counter tops • Detects leakage from diagnostic X-ray machines, especially mammography • Geological surveys • Scrap metal yards • HAZMAT 	<ul style="list-style-type: none"> • Energy compensated to eliminate low energy over response • Convenient size to fit in small spaces around linear accelerators • X-ray tube manufacturers 	<ul style="list-style-type: none"> • Ultra sensitive alpha, beta, gamma probe with directional focus • Nuclear medicine • Emergency response 	<ul style="list-style-type: none"> • Ultra sensitive alpha, beta, gamma probe with directional focus • Nuclear medicine • Emergency response 	<ul style="list-style-type: none"> • Rugged probe with beta discrimination • Scrap metal yards • Rugged to drop down wells • Nuclear medicine 	<ul style="list-style-type: none"> • Beta, gamma probe is more sensitive than 491-40 or 493-50, but has max. rate of 100 mR/hr
Typical Background (Shielded)	30 CPM	15 CPM	50 CPM	15 CPM	15 CPM	20 CPM
Maximum Exposure Rate with Model 190	80 mR/h (800 µSv/hr)	1 R/h (10 mSv/hr)	80 mR/h (800 µSv/hr)	1 R/h (10 mSv/hr)	1 R/h (10 mSv/hr)	100 mR/h (1 mSv/hr)
Nominal Sensitivity to 1 mR/hr of 60 Co	3500 CPM	720 CPM	3900 CPM	720 CPM	720 CPM	2200 CPM
Replacement G.M. Tube Part Number	P-115	35-166	489 - 76	35 - 166	35 - 166	35 - 150
Wall Material	Stainless Steel with Mica window	Stainless Steel with Mica Window	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Wall Thickness	1.5 - 2.0 mg/cm ²	40 - 60 mg/cm ²	1.4 - 2.0 g/cm ²	40 - 60 mg/cm ²	40 - 60 mg/cm ²	30 - 40 mg/cm ²
Active Length	1.5 in Ø (38mm)	.75 in (19.1 mm)	4 in (102 mm)	.75 in (19.1 mm)	.75 in (19.1 mm)	2.25 in (57.2 mm)
Quenching Gas	Neon & Halogen	Neon & Halogen	Neon & Halogen	Neon & Halogen	Neon & Halogen	Neon & Halogen
Diameter of Probe	2.6875 in (68 mm)	1.375 in (35 mm)	1.3125 in (33.4 mm)	1.25 in (32 mm)	1.1875 in (30 mm)	1.1875 in (30 mm)
Length of Probe	9.75 in (248 mm)	6.7 in (170 mm)	7.5 in (191 mm)	3.3125 in (84 mm)	5.375 in (136 mm)	5.375 in (136 mm)
Cable Length	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)	48 in (122 cm)
Weight	Approx. 1.0 lb (0.45 kg)	Approx. .59 lb (263 g)	Approx. 1.0 lb (0.45 kg)	Approx. 1.0 lb (0.45 kg)	Approx. 1.0 lb (0.45 kg)	Approx. 1.0 lb (0.45 kg)
Operating Voltage	900 V	900 V	900 V	900 V	900 V	900 V
Humidity Range	0 - 95%	0 - 95%	0 - 95%	0 - 95%	0 - 95%	0 - 95%
Operating Temperature Range	- 65°F to + 185°F (- 56°C to + 85°C)	- 65°F to + 185°F (- 56°C to + 85°C)	- 65°F to + 185°F (- 56°C to + 85°C)	- 65°F to + 185°F (- 56°C to + 85°C)	- 65°F to + 185°F (- 56°C to + 85°C)	- 65°F to + 185°F (- 56°C to + 85°C)
Pressure Range	To 5 psig	To 15 psig	To 5 psig	To 15 psig	To 15 psig	To 15 psig
Energy Dependence	Seep grahs	Seep grahs	Seep grahs	Seep grahs	Seep grahs	Seep grahs

* Model 489-110C Pancake Probe with metal housing and MHV connector.
 Model 489-110D Pancake Probe with ABS plastic housing and MHV connector.
 Model 489-110E Pancake Probe with metal housing and BNC connector.

GM Probe Typical Energy Dependence



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