

Gamma and X-Ray Standards

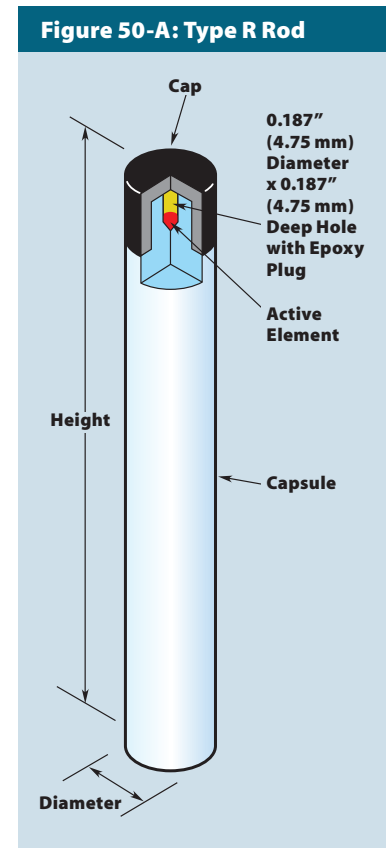
Gamma Standards—Type R

The type R rod is used for calibrating well type NaI(Tl) detectors. It is constructed of high strength plastic and is offered in three sizes: 5" high x 0.625" diameter (127 mm x 15.9 mm), 5" high x 0.5" diameter (127 mm x 12.7 mm) and 2.95" x 0.5" diameter (74.9 mm x 12.7 mm). The active diameter of the rod standard is 0.187" (4.75 mm).



Window & Active Materials	
Window	Nature of Active Materials
Plastic	Evaporated Metallic Salts

Overall Dimensions				
Assembly	X	Height	Diameter	Active Diameter
A1100	R1	5" (127 mm)	0.625" (15.9 mm)	0.187" (4.75 mm)
A1102	R2	5" (127 mm)	0.5" (12.7 mm)	0.187" (4.75 mm)
A1103	R3	2.95" (74.9 mm)	0.5" (12.7 mm)	0.187" (4.75 mm)



Gamma Standards—Type R					
Catalog Number	Nuclide	Half-Life	Major Photon Emissions (keV)	Available Activities	
GF-241-x	Americium-241	432.17 y	59.5 (36%), 11-20 (39.5%) Np L x-rays	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-124-x	Antimony-124	60.20 d	602.7(97.9%), 722.8(10.9%), 1690.9(47.6%)	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-125A-x	Antimony-125A	1007.7 d	428(29.7%), 464(10.5%), 601(17.7%), 607(5%), 636(11.2%), 27-32(75.1%) Te K x-rays	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-133-x	Barium-133	3862 d	80(34.1%), 303(18.3%), 356(61.9%), 32-37(53.2%) Cs K x-rays	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-007-x	Beryllium-7	On Request			
GF-207-x	Bismuth-207	1.16 x 10 ⁴ d	570(97.7%), 1064(74.5%), 9-15(32.5%), Pb L x-rays, 72-88(77.7%) Pb K x-rays	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-109-x	Cadmium-109	462.6 d	88(3.6% from Ag-109 m), 22-26(99.4%) Ag K x-rays	50 nCi-1 mCi	1.85 kBq-37 MBq
GF-139-x	Cerium-139	137.640 d	33.03(22.8%), 33.4(41.9%), 165.9(79.9%), 33-39(80%) La x-rays	5 nCi-10 µCi	185 Bq-370 kBq
GF-141-x	Cerium-141	32.5 d	36.0 (9.1%), 35.6 (5%), 145.4 (48.4%), 352.42 (17%), Pr x-rays	On Request	—
GF-134-x	Cesium-134	754.28 d	563(8.4%), 569(15.4%), 605(97.6%), 796(85.4%)	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-137-x	Cesium-137	30.17 y	662(85.1% from Ba-137), 32-37(7.2%) Ba K x-rays	5 nCi-1 mCi	185 Bq-37 MBq
GF-051-x	Chromium-51	27.706 d	320(9.86%), 4.9-5.4(22.8%) V K x-rays	25 nCi-500 µCi	925 Bq-18.5 MBq

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Catalog Number	Nuclide	Half-Life	Major Photon Emissions (keV)	Available Activities
GF-056-x	Cobalt-56	77.31 d	846.8 (99.9%), 1238 (66.1%), 1771 (15.5%), 2035 (7.8%), 2598 (17%), 3253 (7.6%), others up to 3452	10 nCi-100 µCi 370 Bq-3.7 MBq
GF-057-x	Cobalt-57	271.79 d	14 (9.2%), 122 (85.6%), 136.5 (10.7%), 6.4-7.1 (57.9%) Fe K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-058-x	Cobalt-58	70.86 d	810 (99.5%), 6.4-7.1 (26.7%) Fe K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-060-x	Cobalt-60	5.272 y	1173 (100%), 1333 (100%)	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-152-x	Europium-152	4933 d	122-1408, 40-47 (74%) Sm +Gd x-rays	25 nCi-100 µCi 925 Bq-3.7 MBq
GF-154-x	Europium-154	3136.8 d	123-1597, 42-50 (25.6%) Gd x-rays	25 nCi-100 µCi 925 Bq-3.7 MBq
GF-155-x	Europium-155	1770 d	87 (34%), 105 (20.6%), 42-50 (24.0%), Gd K x-rays	10 nCi-100 µCi 370 Bq-3.7 MBq
GF-153-x	Gadolinium-153	242 d	97 (29.5%), 103 (21.1%), 40-49 (122%) Eu K x-rays	10 nCi-100 µCi 370 Bq-3.7 MBq
GF-068-x	Germanium-68	270.8 d	511 (178%), 1077 (3.2%) from Ga-68, 9.2-10.4 (44.1%) Ga K x-rays, 8.6-9.6 (4.7%) Zn K x-rays	100 nCi-100 µCi 3.7 kBq-3.7 MBq
GF-166-x	Holmium-166m	1200 y	81-1427, 48-58 (37.6%) Er K x-rays	10 nCi-10 µCi 370 Bq-370 kBq
GF-125-x	Iodine-125	59.43 d	35 (6.58%), 27-32 (139%) Te K x-rays	10 nCi-10 µCi 370 Bq-370 kBq
GF-129-x	Iodine-129	1.57 x 10 ⁷ y	40 (7.5%), 29-35 (70.4%) Xe K x-rays	50 nCi-1 µCi 1.85 kBq-37 kBq
GF-059-x	Iron-59	44.51 d	1099 (56.3%), 1292 (43.7%)	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-054-x	Manganese-54	312.3 d	835 (100%), 5.4-5.9 (25.6%) Cr K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-203-x	Mercury-203	46.595 d	279.2 (81.5%)	10 nCi-50 µCi 370 Bq-1.85 MBq
GF-226-x	Radium-226	1600 y	47-2448 (includes daughters)	50 nCi-10 µCi 1.85 kBq-370 kBq
GF-106-x	Ruthenium-106	1.020 y	512 (20.7%), 622 (9.8%) from Rh-106	25 nCi-100 µCi 925 Bq-3.7 MBq
GF-046-x	Scandium-46	83.79 d	889 (99.9%), 1121 (99.9%)	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-075-x	Selenium-75	119.64 d	121 (17.1%), 136 (58.8%), 265 (59%), 280 (25%), 10.5-12.0 (56.8%) As K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-110-x	Silver-110m	249.8 d	657.8 (94.4%), 884.6 (72.6%)	5 nCi-50 µCi 185 Bq-1.85 MBq
GF-131-x	Simulated I-131	~5 y	356 (from Ba-133), 662 (from Cs-137/Ba-137)	50 nCi-100 µCi 1.85 kBq-3.7 MBq
GF-022-x	Sodium-22	950.8 d	511 (178%), 1275 (100%)	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-085-x	Strontium-85	64.849 d	514 (98.4%), 13.3-15.3 (58.7%) Rb K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-228-x	Thorium-228	698.2 d	84-2614 (includes daughters)	50 nCi-10 µCi 1.85 kBq-370 kBq
GF-113-x	Tin-113	115.09 d	392 (64% from In-113 m), 24-28 (96.8%) In K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-235-x	Uranium-235	7.037 x 10 ⁸ y	143 (10.5%), 186 (53%), 90-105 (10.8%) Th K x-rays	10 nCi-100 nCi 370 Bq-3.7 kBq
GF-238U-x	Uranium (Natural)	4.468 x 10 ⁹ y	26-2448 (includes daughters)	10 nCi-35 nCi 370 Bq-1.29 kBq
GF-088-x	Yttrium-88	106.630 d	898 (94%), 1836 (99.4%), 14.1-16.2 (61.6%) Sr K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-065-x	Zinc-65	244.26 d	1116 (50.6%), 8.0-8.9 (38.7%) Cu K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-095-x	Zirconium-95/Nb-95	64.02 d	724 (44.1%), 757 (54.5%)	10 nCi-50 µCi 370 Bq-1.85 MBq

Gamma Sets—Type R

Catalog Number	Available Activities	Sets Consist Of
GF-290-0.1x	0.1 µCi 3.7 kBq	Ba-133, Cd-109, Co-57, Co-60, Cs-137, Mn-54 and Na-22
GF-290-1x	1 µCi 37 kBq	Ba-133, Cd-109, Co-57, Co-60, Cs-137, Mn-54 and Na-22
GF-290-10x	10 µCi 370 kBq	Ba-133, Cd-109, Co-57, Co-60, Cs-137, Mn-54 and Na-22