

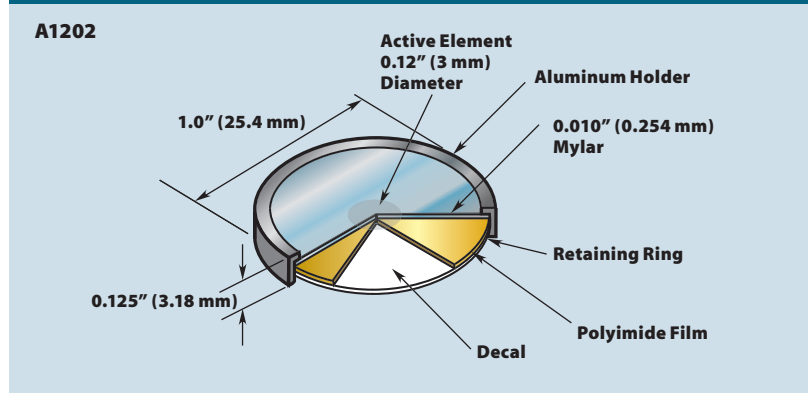
Gamma and X-Ray Standards

Gamma Standards—Type M

The type M thin “scatterless” disk is used in applications involving high resolution solid state detectors. The activity is deposited on 9 mg/cm² aluminumized Mylar (polyester) disk, and covered with 0.9 mg/cm² Kapton (polyimide). The source is supplied in a removable aluminum holder. In the holder the source has an overall diameter of 1” (25.4 mm) and a thickness of 0.125” (3.18 mm). Out of the holder the source is 0.937” (23.8 mm) in diameter with a thickness of approximately 0.030” (0.76 mm). The active diameter is 0.12” (3 mm).



Figure 48-A: Type M Disk



Overall Dimensions

Overall Diameter	Active Diameter	Height
1”	0.12”	0.125”
25.4 mm	3 mm	3.18 mm

Window	Nature of Active Deposit
0.010” (0.254 mm) Aluminized Mylar	Evaporated Metallic Salts

Exceptions
Fe-55: 0.00025” (0.0064 mm) Aluminized Mylar
Am-241: 0.001” (0.0254 mm) Aluminum and Platinum Foils

Gamma Standards—Type M

Catalog Number	Nuclide	Half-Life	Major Photon Emissions (keV)	Available Activities
GF-241-M	Americium-241	432.17 y	59.5(36%), 11-20(39.5%) Np L x-rays	5 nCi-10 µCi 185 Bq-370 kBq
GF-124-M	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-M	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-M	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-M	Beryllium-7	53.28 d	478(10.3%)	25 nCi-500 µCi 925 Bq-18.5 MBq
GF-207-M	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-M	Cadmium-109	462.6 d	88(3.6% from Ag-109 m), 22-26(99.4%) Ag K x-rays	50 nCi-100 µCi 1.85 kBq-3.7 MBq
GF-139-M	Cerium-139	137.640 d	33.03(22.8%), 33.4(41.9%), 165.9(79.9%), 33-39(80%) La x-rays	50 nCi-1 µCi 1.85 kBq-37 kBq
GF-141-M	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-M	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-M	Cesium-137	30.17 y	662(85.1% from Ba-137), 32-37(7.2%) Ba K x-rays	5 nCi-100 µCi 185 Bq-3.7 MBq
GF-051-M	Chromium-51	27.706 d	320(9.86%), 4.9-5.4(22.8%) V K x-rays	25 nCi-100 µCi 925 Bq-3.7 MBq

Gamma Standards—Type M					
Catalog Number	Nuclide	Half-Life	Major Photon Emissions (keV)	Available Activities	
GF-056-M	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-M	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-M	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-M	Cobalt-60	5.272 y	1173(100%), 1333(100%)	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-152-M	Europium-152	4933 d	122-1408, 40-47(74%) Sm +Gd x-rays	25 nCi-100 µCi	925 Bq-3.7 MBq
GF-154-M	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-M	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-M	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-M	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-M	Holmium-166m	1200 y	81-1427, 48-58(37.6%) Er K x-rays	10 nCi-1 µCi	370 Bq-37 kBq
GF-055-M	Iron-55	999 d	5.8-6.5(27.3%) Mn K x-rays	1 µCi-100 µCi	37 kBq-3.7 MBq
GF-059-M	Iron-59	44.51 d	1099(56.3%), 1292(43.7%)	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-054-M	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-M	Mercury-203	46.595 d	279.2(81.5%)	10 nCi-10 µCi	370 Bq-370 kBq
GF-046-M	Scandium-46	83.79 d	889(99.9%), 1121(99.9%)	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-075-M	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-M	Silver-110m	249.8 d	657.8(94.4%), 884.6(72.6%)	5 nCi-50 µCi	185 Bq-1.85 MBq
GF-131-M	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-M	Sodium-22	950.8 d	511(178%), 1275(100%)	5 nCi-100 µCi	185 Bq-3.7 MBq
GF-085-M	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-113-M	Tin-113	115.09 d	392(64% from In-113 m), 24-28(96.8%) In K x-rays	5 nCi-10 µCi	185 Bq-370 kBq
GF-088-M	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-M	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-M	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 M			
Catalog Number	Available Activities	Sets Consist Of	
GF-290-0.1M	0.1 µCi	3.7 kBq	Ba-133, Cd-109, Co-57, Co-60, Cs-137, Mn-54 and Na-22
GF-290-1M	1 µCi	37 kBq	Ba-133, Cd-109, Co-57, Co-60, Cs-137, Mn-54 and Na-22
GF-290-10M	10 µCi	370 kBq	Ba-133, Cd-109, Co-57, Co-60, Cs-137, Mn-54 and Na-22