

# Gamma and X-Ray Standards

## Gamma Standards—Type T

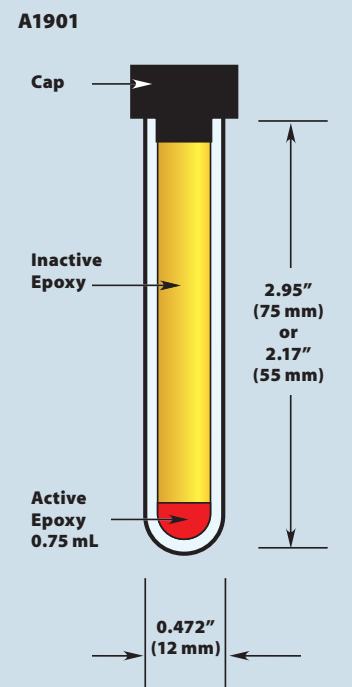
The type T plastic test tube is used in clinical instrument calibrations. Each polypropylene tube contains 0.75 mL of active epoxy with the balance of the tube filled with cold epoxy. Tube sizes are 2.95" high x 0.472" diameter (75 mm x 12 mm) or 2.17" high x 0.472" diameter (55 mm x 12 mm).



Window & Active Materials	
Window	Nature of Active Materials
Not Applicable	Metallic Salts Distributed in Epoxy

Overall Dimensions			
X	Height	Diameter	Active Volume
T1	2.17" (55 mm)	0.472" (12 mm)	0.75 mL
T2	2.95" (75 mm)	0.472" (12 mm)	0.75 mL

Figure 52-A: Type T



Gamma Standards—Type T				
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-10 µCi 185 Bq-370 kBq
GF-124-x	Antimony-124	60.20 d	602.7(97.9%), 722.8(10.9%), 1690.9(47.6%)	5 nCi-10 µCi 185 Bq-370 kBq
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-10 µCi 185 Bq-370 kBq
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-10 µCi 185 Bq-370 kBq
GF-007-x	Beryllium-7	On Request		
GF-207-x	Bismuth-207	1.16 x 10 <sup>4</sup> 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-10 µCi 185 Bq-370 kBq
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-10 µCi 1.85 kBq-370 kBq
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	— —
GF-134-x	Cesium-134	754.28 d	563(8.4%), 569(15.4%), 605(97.6%), 796(85.4%)	5 nCi-10 µCi 185 Bq-370 kBq
GF-137-x	Cesium-137	30.17 y	662(85.1% from Ba-137), 32-37(7.2%) Ba K x-rays	5 nCi-10 µCi 185 Bq-370 kBq
GF-051-x	Chromium-51	27.706 d	320(9.86%), 4.9-5.4(22.8%) V K x-rays	25 nCi-10 µCi 925 Bq-370 kBq

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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-10 µCi 370 Bq-370 kBq
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-10 µCi 185 Bq-370 kBq
GF-058-x	Cobalt-58	70.86 d	810 (99.5%), 6.4-7.1 (26.7%) Fe K x-rays	5 nCi-10 µCi 185 Bq-370 kBq
GF-060-x	Cobalt-60	5.272 y	1173 (100%), 1333 (100%)	5 nCi-10 µCi 185 Bq-370 kBq
GGF-152-x	Europium-152	4933 d	122-1408, 40-47 (74%) Sm + Gd x-rays	25 nCi-10 µCi 925 Bq-370 kBq
GF-154-x	Europium-154	3136.8 d	123-1597, 42-50 (25.6%) Gd x-rays	25 nCi-10 µCi 925 Bq-370 kBq
GF-155-x	Europium-155	1770 d	87 (34%), 105 (20.6%), 42-50 (24.0%), Gd K x-rays	10 nCi-10 µCi 370 Bq-370 kBq
GF-153-x	Gadolinium-153	242 d	97 (29.5%), 103 (21.1%), 40-49 (122%) Eu K x-rays	10 nCi-10 µCi 370 Bq-370 kBq
F-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-10 µCi 3.7 kBq-370 kBq
GF-166-x	Holmium-166m	1200 y	81-1427, 48-58 (37.6%) Er K x-rays	10 nCi-1 µCi 370 Bq-37 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	1.5 x 10 <sup>7</sup> 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-10 µCi 185 Bq-370 kBq
GF-054-x	Manganese-54	312.3 d	835 (100%), 5.4-5.9 (25.6%) Cr K x-rays	5 nCi-10 µCi 185 Bq-370 kBq
GF-203-x	Mercury-203	46.595 d	279.2 (81.5%)	10 nCi-10 µCi 370 Bq-370 kBq
GF-046-x	Scandium-46	83.79 d	889 (99.9%), 1121 (99.9%)	5 nCi-10 µCi 185 Bq-370 kBq
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-10 µCi 185 Bq-370 kBq
GF-110-x	Silver-110m	249.8 d	657.8 (94.4%), 884.6 (72.6%)	5 nCi-10 µCi 185 Bq-370 kBq
GF-131-x	Simulated I-131	~5 y	356 (from Ba-133), 662 (from Cs-137/Ba-137)	50 nCi-10 µCi 1.85 kBq-370 kBq
GF-022-x	Sodium-22	950.8 d	511 (178%), 1275 (100%)	5 nCi-10 µCi 185 Bq-370 kBq
GF-085-x	Strontium-85	64.849 d	514 (98.4%), 13.3-15.3 (58.7%) Rb K x-rays	5 nCi-10 µCi 185 Bq-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-10 µCi 185 Bq-370 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-10 µCi 185 Bq-370 kBq
GF-065-x	Zinc-65	244.26 d	1116 (50.6%), 8.0-8.9 (38.7%) Cu K x-rays	5 nCi-10 µCi 185 Bq-370 kBq
GF-095-x	Zirconium-95/Nb-95	64.02 d	724 (44.1%), 757 (54.5%)	10 nCi-10 µCi 370 Bq-370 kBq

### Gamma Sets—Type T

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