

# National Bureau of Standards Certificate

## Standard Reference Material 4244 Mixed Radionuclide Gamma-Ray Emission-Rate Standard

This sample consists of manganese-54, cobalt-57, cobalt-60, yttrium-88, cadmium-109, tin-113-indium-113m, and cesium 137-barium-137m in approximately 15 ml of approximately 4N HCl in a flame-sealed borosilicate glass bottle.

This sample was made by weighing an aliquot of a calibrated radionuclide mixture into the bottle containing the acid, and flame sealing. The gamma-ray emission rates of the solutions used to prepare the radionuclide mixture were determined by means of the NBS calibrated 4π ionization chamber, and assumed nuclear decay parameters.

The nuclear gamma-ray-emission rates at 1200 EST January 15, 1972, are shown in the table below.

Nuclide	γ-Ray Energy (MeV)*	γ-Ray Intensity (%) *	Half Life	γ/s	Errors %		
					Random	System.	Total
109Cd	0.0877		1.2727y		0.3	2.7	3.0
57Co	0.122	85.6±0.2	271.76d		0.1	2.2	2.3
113Sn-113mIn	0.392		115.31d		0.1	2.8	2.9
137Cs-137mBa	0.662	84.6±0.4	29.93y		0.1	1.9	2.0
54Mn	0.835	99.978±0.002	312.27d		0.1	2.5	2.6
60Co	1.173	99.88±0.02	5.261y		0.1	1.3	1.4
	1.333	100.			0.1	1.3	1.4
88Y	0.898	93.4±0.7	106.61d		0.1	2.9	3.0
	1.836	99.37±0.02				2.2	2.3

\*Nuclear Data Tables, A8, Nos. 1-2 (Oct. 1970).

The total uncertainties in the gamma-ray-emission rates are the linear sums of the respective random errors (limit of random error at the 99 percent confidence level), the above-stated errors in the gamma-ray intensities, and the estimated upper limits of conceivable systematic errors.

The gamma-ray-emission rate of all other contaminants was less than 0.06 percent of the total gamma-ray-emission rate on January 15, 1972.

This standard was prepared in the NBS Center for Radiation Research, Nuclear Radiation Division, Radioactivity Section, W. B. Mann, Chief.

Washington, D.C. 20234  
 February 1972

J. Paul Cali, Chief  
 Office of Standard Reference Materials

SRM-4244-