Department of Commerce
Malcolm Baldrige
Secretary

tional Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate

Standard Reference Material 4226-B

Radioactivity Standard

Radionuclide	Nickel-63
Source identification	SRM 4226-B
Source description	Solution in flame-sealed ampoule
Chemical form	83 μg Ni per gram of 1 N HCl
Mass	4.1 grams
Radioactivity concentration	1.346×10^6 Bq g^{-1} (1)
Reference time	December 1, 1984
Overall uncertainty	1.1 percent (2)
Photon-emitting impurities	None observed (3)
Measuring instrument	Calorimeter (4)
Half life	99.49 ± 2.00 years (5)

This Standard Reference Material was prepared in the Center for Radiation Research, Nuclear Radiation Division, Radioactivity Group, Dale D. Hoppes, Group Leader.

Gaithersburg, MD 20899
December, 1984

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

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NOTES

(1) This ^{63}Ni radioactivity standard is based on energy-emission-rate measurements, in microwatts per gram of solution, made in 1968[4]. The activity is obtained assuming a mean energy per disintegration of ^{63}Ni to be 17.13 ± 0.04 keV, the value given in NCRP Report 58, 1984 edition. This was computed on the basis of an allowed transition of maximum energy 65.88 ± 0.15 keV.

Activity concentration measurements made by three other national laboratories which are in good agreement with the NBS result are described in Lowenthal, G.C., Page V. and Wyllie, H.A. Nucl. Instrum. Meth. 112, 197 (1973).

(2) The overall uncertainty was formed by taking three times the quadratic combination of standard deviations of the mean, or approximations thereto, for the following:

a) 10 groups of energy-emission rate measurements	0.13 percent
b) calorimeter instability	0.15 percent
c) mean energy	0.23 percent
d) half-life correction for Δt = 16.5 years	0.22 percent

(3) This standard was examined for photon-emitting impurities in December, 1984 using Ge(Li) and Si(Li) detectors and none were observed. The detection limits for impurity photons expressed as ratios to the nickel-63 activity are:

4 - 65 keV	3×10^{-9}
65 - 390 keV	1×10^{-8}
390 - 1990 keV	1×10^{-7}.

(4) Barnes, I.L., Garfinkel, S.B., and Mann, W.B., Int. J. Appl. Radiat. Isot. 22, 777 (1971).

(5) NBS-measured value.

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