

National Bureau of Standards

Certificate

Standard Reference Material 4423L

Radioactivity Standard

Radionuclide	Strontium-90
Source identification	4423L-
Source description	Liquid in NBS borosilicate-glass ampoule (1)*
Solution composition	Approximately 370 μg SrCl_2 and 460 μg YCl_3 per gram of approximately 1 M HCl (2)
Mass	grams
Radioactivity concentration	$4.403 \times 10^6 \text{ Bq g}^{-1}$
Reference time	1200 EST November 16, 1985
Overall uncertainty	1.05 percent (3)
Photon-emitting impurities	None detected (4)
Alpha-particle-emitting impurities	None detected (5)
Half life	28.5 ± 0.2 years (6)
Measuring instrument	$4\pi\beta$ proportional counter

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

Gaithersburg, MD 20899
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*Notes on back

NOTES

- (1) Approximately five milliliters of solution. Ampoule specifications:

body diameter	16.5 ± 0.5 mm
wall thickness	0.60 ± 0.04 mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

- (2) Solution density $1.016 \pm 0.002 \text{ g/cm}^3$ at 22.6 °C.

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

a) ten $4\pi\beta$ measurements	0.15 percent
b) background	0.07 percent
c) dead time	0.10 percent
d) self absorption	0.10 percent
e) stability	0.05 percent
f) film absorption	0.20 percent
g) gravimetric measurements	0.15 percent
h) plateau	0.10 percent

- (4) Limits of detection for impurity gamma rays are:

2 s^{-1} between 50 and 1900 keV

- (5) The limit of detection for alpha-particle-emitting impurities is 10^{-5} of the emission rate of strontium-90-yttrium-90.

- (6) NCRP Report No. 58, 2nd edition, February 1985, p. 410.