

National Bureau of Standards Certificate

Standard Reference Material 4250

Radioactivity Standard

Cesium-134

This Standard Reference Material consists of cesium-134 in grams of carrier solution in a flame-sealed borosilicate-glass ampoule. The solution, which contains 57 micrograms of cesium chloride per gram of approximately 0.1 molar hydrochloric acid, has a density of 0.998 grams per milliliter at 20°C.

The radioactivity concentration of the cesium-134 as of 1200 EST September 14, 1977, was

$$*1.101 \times 10^6 \text{ s}^{-1}\text{g}^{-1} \pm 1.12\%*$$

This Standard Reference Material was measured, relative to a radium-226 reference source, in the National Bureau of Standards "4π"γ pressure ionization chamber which had previously been calibrated, in terms of a radium-226 reference source, with cesium-134 solutions from which quantitative sources had been prepared and 4πβ-γ coincidence-counted.

The uncertainty in the radioactivity concentration, 1.12 percent, is the linear sum of 0.02 percent, which is the limit to the random error at the 99-percent confidence level ($2.807 S_m$, where S_m is the standard error of the mean computed from independent measurements of 24 samples) and 1.10 percent, which is the estimated upper limit of conceivable systematic errors.

The solution from which this Standard Reference Material was prepared was examined for photon-emitting impurities with germanium-spectrometer systems and none was observed. The detection limits for impurity gamma rays may be expressed as a percentage of the gamma-ray-emission rate of the 604.699-keV gamma ray of cesium-134. These limits are approximately 0.1 percent for gamma rays with energies below 800 keV and 0.01 percent for those of higher energy.

This Standard Reference Material was prepared in the Center for Radiation Research, Radioactivity Section, W. B. Mann, Chief.

Washington, D. C. 20234
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J. Paul Cali, Chief
Office of Standard Reference Materials

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