



# Certificate

## Standard Reference Material 4225

### Radioactivity Standard

### Tin-113-Indium-113m

This standard consists of tin-113 in equilibrium with its daughter product, indium-113m, in  $5.279 \pm 0.009^*$  grams of solution in a flame-sealed glass ampoule. The chemical form of the material is  $\text{SnCl}_4$  in approximately 2.5N HCl.

\* The uncertainty, 0.009 gram, is the limit of error computed from a sample size of 9, with 95 percent probability for coverage of 95 percent of the population. See Handbook 91 (Experimental Statistics), U. S. Department of Commerce, National Bureau of Standards, pp. 1-14, 1-15, T-11.

The number of indium-113m gamma rays emitted per second per gram of solution at 0800 EST April 15, 1968, was

$$* 1.39_1 \times 10^5 \pm 2.1\% *$$

The solution from which this standard was prepared was standardized by photopeak-scintillation counting with both NaI(Tl)- and Ge(Li)-gamma-ray spectrometers.

The solution contains an impurity, antimony-125, and the ratio of the activity of antimony-125 to the activity of tin-113-indium-113m on the certification date was  $0.22 \pm 0.01$  percent, assuming the following nuclear constants:

Abundance of the 599-keV gamma-ray complex of antimony-125	24.2 %
Abundance of the 423-keV gamma-ray of antimony-125	31 %
Internal conversion coefficient for the 393-keV indium-113m transition	0.55

The uncertainty, 2.1<sub>7</sub> percent, is the sum of 0.7<sub>1</sub> percent, which is the standard error of the weighted mean at the 99-percent confidence level ( $3.25 s_{m1}$ , and  $4.03 s_{m2}$ , where  $s_{m1}$ , and  $s_{m2}$ , are the computed standard errors for the NaI(Tl) and Ge(Li) measurements, respectively), and 1.4<sub>6</sub> percent, which is the maximum uncertainty due to assessable systematic errors in the preparation and measurement of this standard.

A half life of  $115.6 \pm 0.1$  days is suggested. This value is the weighted mean of two determinations and is based on 26 sets of  $4\pi\gamma$  ionization chamber measurements which were corrected for the antimony-125 impurity. The uncertainty, 0.1 day, is the standard error of the weighted mean.

This standard was prepared and calibrated in the Center for Radiation Research by members of the Radioactivity Section, W. B. Mann, Chief.

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W. Wayne Meinke, Chief  
Office of Standard Reference Materials