

Certificate

STANDARD REFERENCE MATERIAL 4226

Radioactivity Standard

Nickel-63

This standard consists of nickel-63 and carrier in approximately 4.1 grams of solution in a flame-sealed glass ampoule. The carrier solution contains 84 milligrams of nickel per liter 1 N HCl.

A sample of nickel metal was standardized microcalorimetrically and quantitatively dissolved. This standard is one of a group which had been prepared by subsequent dilution of the master solution. The energy-emission rate in microwatts per gram of solution, was, on May 27, 1968,

$$* 4.14_5 \times 10^{-3} \pm 0.7_2 \% *$$

Assuming the mean energy per disintegration of nickel-63 to be 17.23 ± 0.04 keV, the corresponding activity in nuclear transformations per second per gram of solution on May 27, 1968, was

$$* 1.50_1 \times 10^6 \pm 0.9_5 \% *$$

The solution contains an impurity, silver-110m, and the ratio of the activity of silver-110m to the activity of nickel-63 on the certification date was 1.6×10^{-9} . It is estimated that this amount of silver-110m would have an effect of less than 0.01% on the microcalorimeter measurements.

The uncertainty in the activity, 0.9₅ percent, is the sum of 0.4₂ percent, which is the limit of the random error at the 99-percent confidence level (i.e. $3.25 \epsilon_m$, where ϵ_m is the standard error computed from ten groups of measurements), 0.3₀ percent, which is the maximum uncertainty due to the estimated systematic errors in the measurements, and 0.2₃ percent, which is the uncertainty in the mean energy per disintegration of nickel-63.

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

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J. Paul Cali, Acting Chief
Office of Standard Reference Materials

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