

National Bureau of Standards

Certificate

Standard Reference Material 4928-C

Radioactivity Standard

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|-----------------------------|---|
| Radionuclide | Sulfur-35 |
| Source identification | SRM 4928-C |
| Source description | Solution in NBS borosilicate-glass ampoule (1)* |
| Chemical composition | 0.10 mg Li ₂ SO ₄ per gram of 0.1 N hydrochloric acid |
| Mass | 4.0 grams |
| Radioactivity concentration | 3.725×10^5 Bq g ⁻¹ |
| Reference time | 0700 EST August 17, 1985 |
| Overall uncertainty | 0.37 percent (2) |
| Photon-emitting impurities | None observed (3) |
| Measuring instrument | 4 π β liquid-scintillation counter (4) |
| Half life | 87.44 \pm 0.07 days (5) |

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
October 1985

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

*Notes on back

NOTES

- (1) Approximately four 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) 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) 20 liquid-scintillation measurements | 0.02 percent |
| b) ³ H reference beta-particle standard | 0.07 percent |
| c) quenching in the liquid-scintillation measurements | 0.05 percent |
| d) source preparation | 0.05 percent |
| e) dead-time correction | 0.05 percent |
| f) scintillator stability | 0.05 percent |

- (3) The master solution (33 MBq) from which these standards were prepared was examined with a germanium detector and no impurities were observed. The detection limit for gamma-ray-emitting impurities is approximately one part per million.

- (4) The liquid-scintillation counter was standardized using the NBS [³H]-water standard SRM 4927-C. The counting efficiency for a Beckman LS7800 liquid-scintillation counter was then computed using the NBS CYBER 855 and the computer program EFFY [E. Garcia-Torano and A. Grau Malonda, Computer Physics Communications, 36, 307 (1985)]. For 10 mL of scintillator and 50 µL of sample, the nominal efficiencies for the ³H and ³⁵S were, respectively, 50% and 92.4%, for the two-phototube system with a coincidence requirement.

- (5) NCRP Report 58, 2nd Edition, February 1985, p. 373.

For further information please contact Dr. Bert M. Coursey
at (301) 921-2383.