

# National Bureau of Standards

## Certificate

### Standard Reference Material 743

### Mercury

Triple Point on the  
International Practical Temperature Scale (1968)

-38.841 °C

This Standard Reference Material is recommended for calibrating temperature measuring devices. The temperature given above is based on the experimental comparison of slowly freezing mercury (14 hour freeze) in four sealed cells which were free of any gas. Two of these cells were prepared by combining seven ampoules of SRM 743 and two contained the high purity NBS Density Standard Mercury. The triple point temperatures of all four cells were found to agree within 0.1 mK.

The absolute value of the triple point temperature given above is based on measurements with one of the NBS Density Standard mercury cells and five platinum resistance thermometers calibrated in terms of the IPTS-68. Twelve observations were made with the thermometers in two freezes. The standard deviation of these observations is 0.1 mK.

The calculated effect of pressure on the freezing point of mercury is +5.4 mK per atm. Although temperature measurements are more precise and convenient with sealed, gas-free mercury cells, for those who prefer to employ cells open to the ambient pressure the freezing point at 1 atm pressure is estimated to be -38.836 °C. *Since the fixed point is below ambient temperature, precautions should be taken to avoid condensation of moisture on the mercury sample.*

Technical measurements at NBS leading to certification were performed by G. T. Furukawa, J. L. Riddle, and W. R. Bigge of the NBS Heat Division.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. E. Michaelis and R. K. Kirby.

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J. Paul Cali, Chief  
Office of Standard Reference Materials

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#### SUPPLEMENTARY INFORMATION

The freezing point of mercury is one of the secondary reference points for the IPTS-68. The experimentally realized value given in this certificate is the same as that adopted by the Comité International des Poids et Mesures. For further information of temperature scales and metal freezing points, see The International Practical Temperature Scale of 1968, *Metrologia* 5, 35 (April 1969) and McLaren, E. H., The Freezing Point of High-Purity Metals and Precision Temperature Standards, *Temperature, its Measurements and Control in Science and Industry*, Vol. 3, Part 1, Rheinhold Publishing Corp., New York, N. Y. (1962).

The mercury for this standard is of exceptional purity with the total of other elements estimated to be less than 20 parts per billion (ng/g) by emission spectrographic analysis. This mercury was obtained from Cominco American, Inc., Spokane, Washington. SRM 743 is packaged in argon-filled soft-glass ampoules and weighs about 680 g (50 ml).