



# National Institute of Standards & Technology

## Certificate

### Standard Reference Material 1387

#### Certified Coating Weight Calibration Standard

#### (Gold on Nickel)

This Standard Reference Material (SRM) is a single gold coating plate that is designed for calibrating coating thickness gages of the beta-backscatter type and calibrating x-ray fluorescence instruments for the measurement of the mass per unit area of gold coating. The gold coating on the plate is at least 99.9% gold and is electrodeposited over a 50  $\mu\text{m}$  thick layer of Watts nickel electroplated on an AISI 1010 steel substrate.

The SRM is a 15  $\times$  15 mm plate which is mounted in a recess in a plastic holder. An uncoated substrate is also provided as a blank reference sample. The mass per unit area of the SRM specimen is certified to be within 10% of the mass per unit area at its center and of the average mass per unit area over the surface. The CERTIFIED value is:

**Specimen Serial No.                      Mass per unit area ( $\text{mg}/\text{cm}^2$ ).**

The certified mass per unit area for this specimen is also listed on a label placed on the plastic box containing this specimen. The SRM should be stored in this box when not in use.

The nominal thickness in micrometers was estimated using the formula:

$$\text{Thickness } (\mu\text{m}) = \frac{\text{Mass per unit area } (\text{mg}/\text{cm}^2) \cdot 10}{\text{Density } (\text{g}/\text{cm}^3)}$$

and assuming the density of gold to be 19.3  $\text{g}/\text{cm}^3$ . The nominal thickness for this SRM is 1.1  $\mu\text{m}$ .

The gold coating was measured by beta-backscatter or by an x-ray fluorescence technique using NIST master standards for which the average mass per unit areas were determined by mass and area measurements. This SRM is suitable for the direct calibration of equipment used to measure mass per unit area of gold coatings. This is done in terms of the thickness of gold coating by dividing the certified mass per unit area by the density of gold to be measured and converting to the desired thickness units.

**CAUTION:** Any modification to this SRM, e.g. altering or removing it from the plastic block on which it is mounted, nullifies the certification of the SRM. The certified value is no longer valid when the gold is visibly worn.

Overall direction and coordination of the technical measurements at NIST leading to certification were performed under the direction D. S. Lashmore, of the Metallurgy 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. L. McKenzie.

Gaithersburg, MD 20899  
January 11, 1990

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