

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 352a

Hydrogen in Unalloyed Titanium

Analytical Program Performed at the Albany Research Center,
U.S. Bureau of Mines, Albany, Oregon, by A. J. Mackie

This standard is in the form of small platelets, approximately 3.2 mm square and 1.5 mm thick, intended for the calibration of hot-extraction and vacuum-fusion apparatus used in the determination of hydrogen.

CAUTION: Prior to use, the material should be washed in acetone or trichloroethylene, and thoroughly dried. The bottle should be kept tightly closed except when in direct use.

SRM No.	352a	
Designation	Unalloyed Titanium	
<u>Element</u>	<u>Certified Value^a</u>	<u>Estimated Uncertainty^b</u>
Hydrogen	<u>Parts per Million by Weight, $\mu\text{g/g}$</u> 20	3

^aThe hydrogen value listed is the *present best estimate* of the "true" value based on the cooperative analytical program for certification.

^bThe estimated uncertainty listed is based on judgment and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability for samples of 0.2 g (or more).

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.

PLANNING, PREPARATION, TESTING, ANALYSIS:

The base material for this SRM was a selected sheet of commercial unalloyed titanium, approximately 1 m x 3 m x 1.5 mm thick. At the Albany Research Center, U.S. Bureau of Mines, Albany, Oregon, samples were punched from the sheet and hydrogen determinations made to provide a concentration profile of the entire sheet. The sheet was cut into panels approximately 1 m long and approximately 0.3 m wide; identified, and sent to NBS.

At NBS, selected panels, after edge discard, were nibbled and/or sheared to form the platelets. These were vapor degreased, sprayed, ultrasonically cleaned with trichloroethylene, tumbled dry, and placed in five bulk containers. Samples were taken from each bulk container for homogeneity testing, and a well-blended composite was obtained for the certification program.

The analytical work for homogeneity testing and certification was performed at the Albany Research Center, U.S. Bureau of Mines, Albany, Oregon, by A. J. Mackie and D. H. Bollman. Samples were run in at least quadruplicate. The maximum observed deviation for hydrogen was ± 2.2 ppm ($n = 26$). Previously issued SRM 352, certified at 32 ± 2 ppm (1 sigma), was also run ($n = 8$) and yielded 32.4 ± 1.5 (1 sigma).

Cooperative analyses on the composite sample only were performed at the Oregon Metallurgical Corporation, Albany, Oregon, by A. D. Fryer; and at Teledyne Wah Chang, Albany, Oregon, by J. H. Schlewitz. The average results from the cooperating laboratories ($n = 4$ and 8, respectively) fell within the estimated uncertainty.