

**National Bureau of Standards**  
**Certificate of Analysis**  
**Standard Reference Material 723a**  
**2 Amino-2-(hydroxymethyl)-1,3-propanediol**  
**[tris(Hydroxymethyl)aminomethane]**  
**(HOCH<sub>2</sub>)<sub>3</sub>CNH<sub>2</sub>**  
**Basimetric Standard**

This Standard Reference Material consists of highly purified 2-amino-2-(hydroxymethyl)-1,3-propanediol [tris-(hydroxymethyl)aminomethane; "THAM"; "TRIS"] hereafter referred to as "TRIS". It is intended for use in basimetric standardization.

Basimetric assay ..... 99.9703 ± 0.0028 weight percent

The above cited uncertainty represents the 95 percent confidence interval for the mean, based on 21 degrees of freedom.

No evidence was found for variability between samples from different segments of the lot beyond that accounted for by the random error of measurement. Thus, the material is considered to be homogeneous within the indicated uncertainty limits. Stereo and polarized light microscopic examination of SRM 723a showed no significant particulate contamination. The examination revealed some fluid inclusions of mother liquor.

This lot of "TRIS" was prepared by the Sigma Chemical Company of St. Louis, Missouri.

The experimental design was developed by K. R. Eberhardt of the Statistical Engineering Division, who also statistically evaluated the results. Analytical measurements were performed by G. Marinenko of the Inorganic Analytical Research Division. The microscopic examination was made by E. B. Steel of the Gas and Particulate Science Division.

The technical and support aspects involved in the procurement, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. W. Seward.

**COULOMETRIC ASSAY:** Since direct coulometric titration of "TRIS" has been shown by studies at the National Bureau of Standards to be infeasible, the indirect method, developed by NBS, was used. This method consists of the quantitative addition of an excess amount of coulometrically standardized acid to the weighted sample of "TRIS" followed by coulometric back-titration of the residual acid.

Approximately 1.0 molar hydrochloric acid solution, standardized coulometrically, was used in these titrations. Back-titration of the acid was carried out to a differential potentiometric inflection point. In each determination, about one gram of "TRIS" and about nine grams of the standardized hydrochloric acid solution were used. Using 100 mL of 0.1 M NaCl supporting electrolyte, the  $(\Delta\text{pH}/\Delta\text{C})_{\text{max}}$  occurred in the vicinity of  $\text{pH} = 4.5$ .

In the experiment, eleven bottles of SRM 723a were randomly selected from the whole lot and were assayed in duplicate by precise coulometric titration.

The coulometric procedure used in these measurements is similar to the one employed for the certification of "TRIS" SRM 723 and was described earlier [G. Marinenko, "Coulometric Analysis," NBS Tech Note 425, J. Res. Nat. Bur. Stand. (U.S.), 75A, No. 5, 421 (1971)]. The value of the Faraday constant used in this work is 96,486.5 A·sec·mol<sup>-1</sup>. The molecular weight of "TRIS" used is 121.1372. Corrections for the effect of buoyancy of air were applied using 1.35 g·cm<sup>-3</sup> as the density of "TRIS." The electrochemical equivalent of this lot of "TRIS" was determined to be 1.255857 ± 0.000035 mg/coulomb, where the uncertainty figure represents the 95% confidence interval of the mean, based on 21 degrees of freedom.

**DRYING:** The assay value is based upon samples dried at 25 °C in a vacuum desiccator over anhydrous magnesium perchlorate for 24 hours. Drying of this material by heating is not recommended.