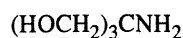# National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 723b

2-Amino-2-(hydroxymethyl)-1,3-propanediol

[tris(Hydroxymethyl)aminomethane]

$(HOCH_2)_3CNH_2$

Basimetric Standard

This Standard Reference Material (SRM) 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 and is supplied in a unit of 50 g.

The certified basimetric assay of this lot of "Tris" is: 99.9238 ± 0.0069[a] wt %.

[a] (See Table 1, Components of Uncertainty)

The above uncertainty was calculated according to NIST Technical Note 1297 [1], Guidelines for Evaluating Uncertainty of NIST Measurement Results, at an approximate 95 % level of confidence.

STABILITY AND STORAGE

Certification will be valid for 3 years from the date of shipment from NIST, when stored in the original container, with the cap tightly closed, and under normal laboratory conditions of temperature and humidity. The assay value is based on the material as packaged without further grinding. Additional grinding results in loss of occluded water and a higher assay value. Periodic reanalysis of representative samples from this SRM lot will be performed, and if significant changes are observed within the three year period, the purchaser will be notified by NIST. Please return the enclosed registration card to facilitate notification.

Source of Material: This lot of "Tris" was prepared by Sigma Chemical Co. of St. Louis, MO.

The statistical analysis of the certification data was performed by L. Oakley of the NIST Statistical Engineering Division. Analytical measurements were performed by K. Pratt of the NIST Inorganic Analytical Research Division.

The overall coordination of technical measurements leading to certification was performed under the direction of W.F. Koch of the NIST Inorganic Analytical Research Division.

The technical and support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by J.C. Colbert.

Gaithersburg, MD 20899
April 12, 1993

Thomas E. Gills, Acting Chief
Standard Reference Materials Program

(over)

Coulometric Assay: The assay value for this material was obtained by automated coulometric back-titration of weighed "Tris" samples after addition of excess coulometrically standardized HCl. The endpoint (dpH/dQ_{max}) occurred at approximately pH 4.7 in 1.0 mol/L KCl. The certified value represents the result of six such titrations of samples from each of six randomly selected bottles from the entire lot of SRM 723b.

The coulometric procedure is similar to that described in Reference [2] for the coulometric titration of weak acids. The mathematical endpoint determination is similar to that described in Reference [3]. The value of the Faraday constant used in this work is 96486.04 C/mol, and the molecular weight of "Tris" used was 121.13628 g/mol. Corrections for the buoyancy effect of air were applied using a density of 1.35 g/cm^3 for "Tris".

Drying Instructions: The assay value is based upon samples dried for 24 h at room temperature over anhydrous magnesium perchlorate. Drying of this material at elevated temperatures is not recommended due to the possibility of decomposition and/or loss of occluded water.

<p align="center">Table 1. Components of Uncertainty</p>

Source	Degrees of Freedom	u_i	Type of Uncertainty
Standard error of the mean	5	0.0020	"A"[a]
Untitrated Tris•HCl in the intermediate cell compartments	∞	0.0005	"B"[b]
Electrical	∞	0.0006	"B"
Unrinsed titrant or analyte in the frits	∞	0.0006	"B"
HCl concentration	6	0.0023	"A"

The expanded uncertainty, $U = ku_c$, is 0.0069, which is determined by the coverage factor and the combined standard uncertainty. The coverage factor, $k = 2.16$, is based on the Student's t distribution for 13 effective degrees of freedom and a two-sided coverage probability of 95%. The combined standard uncertainty is $u_c = 0.0032$, which is the root sum of squares of the components of uncertainty.

[a] Type "A" uncertainties are those which are evaluated by statistical methods [1].
[b] Type "B" uncertainties are those which are evaluated by other means. [1]

<p align="center">REFERENCES</p>

[1] Taylor, B.N., and Kuyatt, C.E., NIST Tech. Note 1297, Jan. 1993.
[2] Taylor, J.K., and Smith, S.W., J. Res. Nat. Bur. Std. (U.S.); 63A (2), p. 153 (1959).
[3] Koch, W.F., Poe, D.P., and Diehl, H., Talanta, 22, p. 609 (1975).