

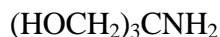


Certificate of Analysis

Standard Reference Material[®] 723d

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

[tris(Hydroxymethyl)aminomethane]



Acidimetric 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. SRM 723d is intended primarily for use in acidimetric standardization. A unit of SRM 723d consists of 50 g in a clear glass bottle.

Certified Value: The certified value, reported in Table 1 as a mass fraction, is based on coulometric assays of dried material (see “Drying Instructions”), including the effects of air buoyancy. The certified value is based on the results of duplicate determinations from each of 10 randomly selected bottles from the entire lot of SRM 723d. Each determination was obtained by coulometric acidimetric back-titration [1] of the given Tris sample to the inflection point (pH ca. 4.8) after addition of excess coulometrically-standardized HCl.

Table 1. Certified Value (Mass Fraction) for Tris, Acidimetric Assay

Tris	99.924 % ± 0.036 %
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The uncertainty is an expanded uncertainty, U , calculated as $U = ku_c$, where k is a coverage factor that governs the confidence level of U and u_c is the combined standard uncertainty calculated according to the ISO Guide [2]. The quantity u_c represents, at the level of one standard deviation, the potential combined effects of the uncertainty arising from instrumental sources, chemical interferences, and uncertainties in fundamental constants, combined with the statistically-evaluated prediction interval for a unit of the SRM. The value $k = 2.262$ was used to obtain the cited value for U , representing an approximate 95 % level of confidence.

The certified value was obtained using the current value for the Faraday constant, $96\,485.3415\text{ }^\circ\text{C} \cdot \text{mol}^{-1}$ [3]; and molar mass of Tris, $121.135\,04\text{ g} \cdot \text{mol}^{-1}$ (calculated from [4]). Corrections for air buoyancy were made using $1.35\text{ g} \cdot \text{cm}^{-3}$ for the density of Tris [5].

Expiration of Certification: The certification of **SRM 723d** is valid, within the measurement uncertainty specified, until **01 June 2012**, provided the SRM is handled and stored in accordance with instructions given in this certificate (see “Instructions for Handling, Storage, and Use”). The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

Coulometric analyses were performed by K.W. Pratt of the NIST Analytical Chemistry Division.

Stephen A. Wise, Chief
Analytical Chemistry Division

Gaithersburg, MD 20899
Certificate Issue Date: 03 October 2011
Certificate Revision History on Last Page

Robert L. Watters, Jr., Chief
Measurement Services Division

Statistical consultation for this SRM was provided by H.-K. Liu of the NIST Statistical Engineering Division.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Measurement Services Division.

INSTRUCTIONS FOR HANDLING, STORAGE, AND USE

Use: This SRM is certified for acidimetric assay **ONLY** and is not intended for use in pH standardizations.

Storage: This SRM should be stored in its original bottle at room temperature. It must be tightly re-capped after use and protected from moisture and light.

Drying Instructions: Dry at room temperature (22 °C to 23 °C) for 24 h in a vacuum desiccator over anhydrous magnesium perchlorate or equivalent. Drying of this material at elevated temperatures is not recommended due to the possibility of decomposition and/or loss of occluded water.

Homogeneity: Tests indicate that this SRM is homogeneous within the uncertainty limits for sample sizes greater than 500 mg. Samples less than 500 mg are not recommended in order to avoid possible inhomogeneity with smaller sample sizes.

Source of Material: The Tris used for this SRM was obtained from a commercial source. The material was examined for compliance with the specification for reagent grade Tris as specified by the American Chemical Society [6]. The material was found to meet or exceed these specifications in all respects.

REFERENCES

- [1] Pratt, K.W.; *Anal. Chim. Acta*; Vol. 289, p. 135 (1994).
- [2] JCGM 100:2008; *Evaluation of Measurement Data – Guide to the Expression of in Measurement* (ISO GUM 1995 with Minor Corrections); Joint Committee for Guides in Metrology (JCGM) (2008); available at http://www.bipm.org/utls/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Sep 2011); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297; U.S. Government Printing Office: Washington, DC (1994); available at <http://physics.nist.gov/Pubs/> (accessed Sep 2011).
- [3] Mohr, P.J.; Taylor, B.N.; *CODATA recommended values of the fundamental Physical constants: 1998*; in *Rev. Mod. Phys.*; Vol. 72 No. 2, pp. 351–495 (2000); also in *J. Phys. Chem. Ref. Data*; Vol. 28, No. 6, pp. 1713–1852 (1999); available at [http://physics.nist.gov/cgi-bin/cuu/Value?f\[search_for=faraday](http://physics.nist.gov/cgi-bin/cuu/Value?f[search_for=faraday) (accessed Sep 2011).
- [4] Coplen, T.B.; *Commission of Atomic Weights and Isotopic Abundances*; *Pure & Appl. Chem.*; Vol. 73, No. 4, pp. 667–683 (2001).
- [5] SRM 723a; 2-Amino-2-(hydroxymethyl)-1,3-propanediol [tris(Hydroxymethyl) aminomethane] ($(HOCH_2)_3CNH_2$); National Bureau of Standards; U.S. Department of Commerce: Gaithersburg, MD (20 April 1981).
- [6] *Reagent Chemicals*; 8th ed.; American Chemical Society: Washington, DC (1993).

Certificate Revision History: 03 October 2011 (Editorial changes); 06 March 2011 (certification date extension and editorial changes); 27 February 2009 (certification date extension); 25 March 2003 (original certification date).

Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet at <http://www.nist.gov/srm>.