National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 2426

55 % Aluminum–Zinc Alloy

(In Cooperation with ASTM International)

This Standard Reference Material (SRM®) is intended primarily for use in evaluating chemical and instrumental methods of analysis. A unit of SRM 2426 consists of a bottle containing approximately 40 grams of fine millings.

The certified values for four elements, aluminum (Al), zinc (Zn), silicon (Si), and iron (Fe), in SRM 2426 are listed in Table 1. All values are reported as mass fractions [1]. Value assignment categories are based on the definition of terms and modes used at NIST for chemical reference materials [2].

Certified Values: A NIST certified value is a value for which NIST has the highest confidence in its accuracy, in that all known or suspected sources of bias have been investigated or accounted for by NIST. A certified value is the present best estimate of the true value based on the results of analyses performed at NIST and collaborating laboratories using X-ray fluorescence (XRF) spectrometry, inductively coupled plasma optical emission spectrometry (ICP-OES), and gravimetry. The uncertainty listed with the value is an expanded uncertainty based on a 95 % confidence interval [3] and is calculated according to the method in the ISO and NIST Guides [4].

Expiration of Certification: The certification of this SRM is valid indefinitely, within the uncertainty specified, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Use"). However, the certification will be nullified if the SRM is damaged or contaminated.

Stability: This material is considered to be stable during the period of certification. NIST will monitor this material and will report any significant changes in certification to the purchaser. Registration (see attached sheet) will facilitate notification.

Coordination of the technical measurements for certification was accomplished under the direction of J.R. Sieber of the NIST Analytical Chemistry Division.

Analytical measurements for homogeneity testing and certification of this SRM were performed at NIST by J.R. Sieber, A.F. Marlow, and L.J. Wood of the NIST Analytical Chemistry Division.

Statistical consultation for this SRM was provided by D.D. Leber of the NIST Statistical Engineering Division.

The support aspects involved in the preparation of this SRM were coordinated through the NIST Measurement Services Division.

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Analytical Chemistry Division

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Certificate Issue Date: 31 March 2006

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

Table 1. Certified Values for SRM 2426 Aluminum-Zinc Alloy

Element	Value[(a)] Mass Fraction (%)	Uncertainty[(a)] Mass Fraction (%)	Coverage Factor (*k*)
Al	58.18	0.85	2.4
Zn	38.92	0.70	2.0
Si	1.925	0.030	2.8
Fe	0.454	0.011	2.1

[(a)] The assigned value is an unweighted mean of the results from two analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor *k*, calculated by combining a between-method variance with a pooled, within-method variance following the ISO and NIST Guides [3,5].

INSTRUCTIONS FOR USE

To relate analytical determinations to the certified values in this Certificate of Analysis, a minimum sample quantity of 500 mg is recommended. The millings do not require preparation prior to weighing and dissolution. The material should be stored in its original container in a cool, dry location. Melting and casting of the material is not recommended. In cast form, this material is known to be heterogeneous at levels above 1 % relative standard deviation. See the information in the "Homogeneity" section.

Material Preparation[1]: The material for SRM 2426 was provided by Bethlehem Steel (Sparrows Point, Maryland, USA) and cast by Zincaloy Inc. (Mississauga, Ontario, Canada). One casting was chipped, blended and bottled at NIST under the supervision of M.P. Cronise of the Measurement Services Division.

Homogeneity: The homogeneity of the chipped material was tested using X-ray fluorescence spectrometry at NIST on specimens prepared by pressing 5-g quantities of chips into briquette form at 2×10^4 kg in a 31 mm diameter die. Homogeneity assessment was based on measurements of the full surface of each briquette.

Quantitative Test Methods: Analyses at NIST were performed using XRF spectrometry after sample preparation by acid digestion and borate fusion [6]. Analyses at the cooperating laboratory were performed using (ICP-OES) for Al, Fe, and Zn and using sodium carbonate (Na_2CO_3) fusion with hydrofluoric acid (HF) dehydration for Si.

Cooperating Laboratory: Analytical determinations for certification of this SRM were performed by Dofasco, Inc., 1330 Burlington St. East (Hamilton, Ontario, Canada); A. Scrimshaw and L. Taggart.

[1]Certain commercial equipment, instruments, or materials are identified in this certificate in order to specify adequately the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

REFERENCES

[1] Taylor, B.N.; Guide *for the Use of the International System of Units (SI)*; NIST Special Publication 811 (1995).

[2] May, W.E.; Parris, R.M.; Beck II, C.M.; Fassett, J.D.; Greenberg, R.R.; Guenther, F.R.; Kramer, G.W.; Wise, S.A.; Gills, T.E.; Colbert, J.C.; Gettings, R.J.; MacDonald, B.S.; *Definitions of Terms and Modes Used at NIST for Value-Assignment of Reference Materials for Chemical Measurements*; NIST Spec. Pub. 260–136, U.S. Government Printing Office: Washington, DC, p. 16 (2000).

[3] Hahn, G.J.; Meeker, W.Q.; *Statistical Intervals: A Guide for Practitioners*; John Wiley & Sons, Inc.: New York (1991).

[4] ISO; *Guide to the Expression of Uncertainty in Measurement*; ISBN 92-67-10188-9, 1st ed.; International Organization for Standardization: Geneva, Switzerland (1993); 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/.

[5] Levenson, M.S.; Banks, D.L.; Eberhardt, K.R.; Gill, L.M.; Guthrie, W.F.; Liu, H.k.; Vangel, M.G.; Yen, J.H.; Zang, N.F.; *An Approach to Combining Results from Multiple Methods Motivated by the ISO GUM*; J. Res. Natl. Inst. Stand. Technol., Vol. 105, pp. 571–579 (2000).

[6] Sieber, J.R.; Yu, L.L.; Marlow, A.F.; Butler, T.A.; *Uncertainty and Traceability in Alloy Analysis by Borate Fusion and XRF*; X-Ray Spectrom., Vol. 34, pp. 153–159 (2005).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Group at: telephone (301) 975-6776; fax (301) 926-4751, email srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.