CERTIFICATE OF REFERENCE MATERIAL Nº 2336-103

IPT 40

Forging Brass (2,45% Pb)

This reference material was certified by the consensus of a network of expert laboratories using different methodologies, and can be used for calibration, assessment of precision and trueness and, to demonstrate traceability of results in chemical analysis by classical and instrumental methods.

This material is a forging brass with lead content of 2.45%.

Properties	Certified Values	Expanded Uncertainties	Unit
Cu	58,10	0,06	%
Zn	39,1	0,1	%
Pb	2,45	0,03	%
Sn	0,18	0,02	%
Cd	0,049	0,002	%
Sb	0,023	0,003	%
Al	0,010	0,002	%
Fe	0,007	0,001	%
Ni	0,0012	0,0003	%

Properties		Informative Values	Expanded Uncertainties	Unit
Ag	*Nota/Note (1)*	0,002	0,001	%

Lot Number: 01 Valid until : 08/2030

The certified values and uncertainties are assured by the validity period, considering that the material is handled and stored in accordance with the given instructions, except in case of damage or contamination. IPT will monitor periodically the properties of this reference material during its validity period, and any observed significant change will be reported to the user.

Sao Paulo, 09/2020

Center for Chemistry and Manufactured Goods
Metrological References Laboratory

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Uncertainties

The expanded uncertainties of the certified values were estimated by the combination, according to ISO Guide 35:2006, of uncertainties of characterization, obtained experimentally from the interlaboratory certification program data, and where relevant, with contributions of stability of material, both estimated at IPT. The coverage factor used is approximately 2, providing a confidence level of 95%.

Traceability

The certified values of the properties of this material were obtained by means of measurements performed at IPT and by a network of collaborating laboratories, using one or more methods for each property studied. These methods were verified using reference materials with certified values and standards with values traceable to the International System of Units (SI) through NIST and other qualified producers. The measuring instruments were calibrated adequately.

Mass of samples

The mass of sample required for the proper realization of the determinations depends on the particular methodology, levels of analytes, and other factors. It is recommended using the masses established in the most current editions of recognized standard methods. However, to guarantee the validity of all the certified values stated herein and their respective uncertainties, should not be employed samples with masses smaller than 100 mg. This limit was estimated from the sample masses used in the study of homogeneity of this material.

Handling and storage

Handling: The withdrawal of samples of this material must be accomplished in appropriate environment with clean accessories. Never return material to the bottle. Keep the material in its original bottle, tightly closed. Storage: This material should be stored in a clean place, at room temperature. The ideal relative humidity for storage is under 60% RH.

Technical Notes

Note 1. The silver content showed high uncertainty, being insufficient to establish the certified value, being then presented as an informative value.

Additional Information

The certification of this material was coordinated by Sylvia Lourdes Moro.

This Certificate replaces CRM IPT nº 1901-103

Collaborating Laboratories

INSTITUTO DE PESQUISAS TECNOLÓGICAS DO ESTADO DE SÃO PAULO S.A. – IPT – São Paulo, SP
Tsai Soi Mui Lee, Amândio Prestes Vieira.

NATIONAL BUREAU OF STANDARDS – NBS – Washington D.C., USA
(em cooperação com a "American Society for Testing and Materials – ASTM")
James I. Shultz, R.K. Bell, J.D. Messmann, T.C. Rains.

ELUMA S.A. INDÚSTRIA E COMÉRCIO – DIVISÃO ISAM – Santo André, SP
Valdir Mrocoski, José Rodrigues de Godoy.

COMPANHIA SIDERÚRGICA NACIONAL – CSN – Volta Redonda, RJ
Sebastião Vitor Baliza, Afonso Ferreira de Souza, Maria Losada F. Rodriguez.

TERMOMECÂNICA SÃO PAULO S.A. – São Bernardo do Campo, SP
Teresa Buccheri.

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Methodologies Employed in the Certification of CRM IPT 40

Ag	Atomic Absorption Spectrometry
Al	UV-Visible spectrophotometry (aluminon)
	Atomic Absorption Spectrometry
Cd	Gravimetry (sulfide)
	Atomic Absorption Spectrometry
Cu	Electrogravimetry
Fe	Atomic Absorption Spectrometry
	UV-Visible spectrophotometry (thiocyanate)
Ni	Atomic Absorption Spectrometry
Pb	Gravimetry (chromate)
	Electrogravimetry
	Atomic Absorption Spectrometry
	Titrimetry (thiosulfate)
Sb	Titrimetry (distillation - iodometry)
	Titrimetry (sulfite - permanganate)
	Titrimetry (coprecipitation with manganese-bromatometry)
Sn	Titrimetry (aluminum-iodate)
	Atomic Absorption Spectrometry
	Titrimetry (hypophosphorous acid-iodate)
Zn	Titrimetry (EDTA complexometry)
	Atomic Absorption Spectrometry
	Gravimetry (oxide)

The latest version of the Certificates of IPT Reference Materials are available for download at: www.ipt.br / nmr.htm

Sistema Certificados 9.1.accdb