



## CERTIFICATE OF ANALYSIS

### Bi58Sn42 alloy – LD33

The assigned values<sup>1</sup> and uncertainties<sup>2</sup> in % w/w

Element No.	LD33	
Sb	<b>0.00708</b>	±0.00071
As	<b>0.0234</b>	±0.0021
In	<b>0.00633</b>	±0.00050
Cd	<b>0.00145</b>	±0.00021
Cu	<b>0.0264</b>	±0.0032
Ni	<b>0.00167</b>	±0.00045
Pb	<b>0.0461</b>	±0.0020
Ag	<b>0.00552</b>	±0.00036
Au	<b>0.0226</b>	±0.0024
Sn	<b>42.81</b>	±0.84
Bi	the rest	

<sup>1</sup> Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination.

<sup>2</sup> The certified uncertainty is the expanded uncertainty with a coverage factor  $k=2$ , corresponding to a level of confidence of about 95 %.

Prof. Zbigniew Śmieszek  
Director of the Institute

Certified on October 2018



Description of the material:

The certified reference materials are available in the form of discs (40 mm diameter and ~25 height).

Traceability:

CRMs LD33 series is in accordance with CRMs produced by MBH Analytical Ltd.

Analytical methods applied:

- Sb, As, In, Cd, Cu, Ni, Pb, Ag, Au – Inductively coupled plasma optical emission spectrometry (ICP OES),  
Flame atomic absorption spectrometry (FAAS),  
Inductively Coupled Plasma – Mass Spectrometry (ICP MS)
- Sn – Volumetric method

Participants:

Institute of Non-Ferrous Metals, Analytical Chemistry Department, Gliwice, Poland

- Emission Spectrometry Laboratory
- Atomic Spectrometry Laboratory
- Classical Analytical Methods Laboratory

Universal Scientific Laboratory Pty Ltd, Milperra, Australia

AIM Metals & Alloys S.E.C., Montreal, Canada

Intended use:

The CRM is intended for establishing or checking the calibration of optical emission and X-ray spectrometers for analysis of samples of similar matrix composition (for micro-analysis is not verified).

Instructions for use:

Before every use, the surface of CRM must be prepared by milling or turning on a lathe. Samples should be prepared in the same way as the CRM.

Brief description of the production and certification process:

The CRM<sub>s</sub> – LD33 was made by melting of all components in the inductive, of crucible furnace and by casting into special moulds protecting elimination of segregation of the components during solidification. Homogeneity testing were made taking into account about 40% of the material produced. Investigations were carried out using atomic emission spectrometry method with low voltage spark. Homogeneity was estimated statistically with application of the test F.

The certification of LD33 is valid indefinitely, within the measurement uncertainties specified, provided the CRM is handled in accordance with the instructions given in this certificate.