



CERTIFICATE OF ANALYSIS

Hard Lead PPA series

The assigned values¹ and uncertainties² in % w/w

Element	No.	PPA1	PPA2	PPA3	PPA4
Cd		0.0453 ±0.0029	0.0263 ±0.0022	0.0252 ±0.0006	0.0060 ±0.0004
Bi		0.0553 ±0.0041	0.0648 ±0.0026	0.0324 ±0.0018	0.0108 ±0.0005
Sn		0.686 ±0.0215	0.366 ±0.021	0.308 ±0.022	0.0174 ±0.0034
Ag		0.109 ±0.009	0.0705 ±0.0045	0.0462 ±0.0036	0.0075 ±0.0007
Te		0.0945 ±0.0044	0.0700 ±0.0031	0.0329 ±0.0042	0.0049 ±0.0020
As		0.544 ±0.016	0.344 ±0.018	0.0635 ±0.0058	0.0100 ±0.0016
Sb		2.53 ±0.16	3.49 ±0.16	5.93 ±0.15	8.69 ±0.04
Cu		0.203 ±0.008	0.132 ±0.015	0.0899 ±0.0024	0.0114 ±0.0011
Pb		remain	remain	remain	remain

¹ 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.

² 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 September 2013

Description of the material:

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

Analytical methods applied:

Cd, Bi, Sn, Ag, Te, As, Sb, Cu – Optical emission spectrometry (OES),
Flame atomic absorption spectrometry (FAAS),

Participants:

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

- Optical Emission Spectrometry Laboratory
- Atomic Absorption Spectrometry Laboratory

Institute of Non-Ferrous Metals, Legnica, Poland

Huta Cynku “Miasteczko Śląskie”, Miasteczko Śląskie, Poland

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_s – PPA were 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 over 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 set consists of 4 certified reference materials in form of discs 40 mm in diameter and ~25 mm height.

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