



INSTITUTE OF NON-FERROUS METALS

Analytical Chemistry Department

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CERTIFICATE OF ANALYSIS

CMEA reference materials of the Pb - Sb alloys

1. Country elaborating the reference material: Poland.
2. Designation: the reference materials are designated for making the spectroscopic analysis and calibration of the spectroscopic equipment at analysing alloys of type Pb.
3. Certified characteristics: mass % of elements.

Element	No.	PG 1	PG 2	PG 3	PG 4	PG 5	PG 6
		SO SEV 507-88	SO SEV 508-88	SO SEV 509-88	SO SEV 510-88	SO SEV 511-88	SO SEV 512-88
Cd		0,078	0,064	0,040	0,026	0,011	0,0074
Cu		0,059	0,030	0,030	0,021	0,0078	0,0011
Sb		0,76	0,23	0,52	0,042	0,97	1,45
Bi		0,082	0,071	0,053	0,032	0,017	0,005
Ag		0,020	0,013	0,011	0,0076	0,0024	0,0006
As		0,019	0,015	0,0096	0,0044	----	----
Sn		0,56	0,28	0,10	----	----	----

Director of the Institute

Prof. Ph.D. Zbigniew Śmieszek

The mass % of elements has been determined with the error not greater than the absolute determination ($P = 0,95$)

Element No.	PG 1 SO SEV 507-88	PG 2 SO SEV 508-88	PG 3 SO SEV 509-88	PG 4 SO SEV 510-88	PG 5 SO SEV 511-88	PG 6 SO SEV 512-88
Cd	0,0034 0,0015	0,0016 0,0013	0,0010 0,0014	0,00093 0,0012	0,00098 0,00050	0,001 0,0007
Cu	0,0033 0,0033	0,0019 0,0017	0,0016 0,0016	0,0014 0,0014	0,00034 0,00029	0,0002 0,0001
Sb	0,020 0,019	0,015 0,014	0,022 0,020	0,0026 0,0020	0,030 0,028	0,045 0,030
Bi	0,0027 0,0026	0,0031 0,0031	0,0026 0,0025	0,0016 0,0015	0,0014 0,0012	0,00051 0,00045
Ag	0,00094 0,00094	0,0014 0,0011	0,00069 0,00061	0,00059 0,00081	0,00021 0,00019	0,00010 0,00010
As	0,0019 0,0020	0,0024 0,0025	0,0011 0,00094	0,00086 0,00076	----	----
Sn	0,025 0,026	0,015 0,016	0,0047 0,0035	----	----	----

4. Additional information:

Reference materials dimensions: diameter 10 mm, length 100 mm.

The set comprises 6 types of reference materials.

The mass % of elements (%), for which $m < ?$.

Element No.	PG 1 SO SEV 507-88	PG 2 SO SEV 508-88	PG 3 SO SEV 509-88	PG 4 SO SEV 510-88	PG 5 SO SEV 511-88	PG 6 SO SEV 512-88
As	----	----	----	----	0,0018	0,00050
Sn	----	----	----	0,020	0,0042	0,00060
Te	0,0093	0,018	0,026	0,051	0,093	----

The following methods have been used in determining the individual elements:

- Cd - atomic absorption, spectral emission, polarographic;*
- Cu - atomic absorption, spectral emission, spectrophotometric;*
- Sb - atomic absorption, spectrophotometric, titration, spectral emission;*
- Bi - atomic absorption, spectrophotometric, spectral emission;*
- Ag - atomic absorption, titration, spectral emission;*
- As - spectrophotometric with distilled arsenic - molybdenum blue, spectrographic emission;*
- Sn - atomic absorption, spectrophotometric with phenyl fluoride, spectral emission;*
- Te - spectrophotometric, atomic absorption, spectral emission.*

The reference materials have been tested in 10 laboratories, including: 1 in GDR, 1 in Bulgaria, 1 in USSR.