



INSTITUTE OF NON-FERROUS METALS

Analytical Chemistry Department
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CERTIFICATE OF ANALYSIS

Fire refined copper

The average results of chemical analyses in wt %

Element	No.	CL 1	CL 2	CL 3	CL 4	CL 5
Pb		0,75	1,23	0,030	0,17	----
Ag		0,012	0,045	0,27	0,42	0,52
Zn		0,0067	0,021	0,11	0,17	0,26
Bi		0,017	0,011	0,0076	0,0025	0,00039
Ni		0,43	0,38	0,22	0,049	0,0040
Sn		0,0042	0,055	0,30	0,19	0,32
Sb		0,25	0,20	0,15	0,039	0,0018
As		0,0021	0,061	0,19	0,21	0,28
Fe		0,0013	0,025	0,023	0,16	0,22
Co		0,0012	0,037	0,090	0,16	0,20
Cu		the rest	the rest	the rest	the rest	the rest

Director of the Institute

Prof. Ph.D. Zbigniew Śmieszek

The confidence intervals in wt % at the probability level of 0,05

Element No.	CL 1	CL 2	CL 3	CL 4	CL 5
Pb	0,017	0,0066	0,00092	0,0057	----
Ag	0,053	0,0022	0,015	0,0066	0,015
Zn	0,00020	0,0011	0,0046	0,0041	0,018
Bi	0,00095	0,0057	0,00046	0,00029	0,000076
Ni	0,0090	0,013	0,072	0,0013	0,00010
Sn	0,00047	0,0031	0,012	0,013	0,011
Sb	0,012	0,0085	0,0014	0,0012	0,00029
As	0,00044	0,0019	0,0084	0,013	0,014
Fe	0,00034	0,0024	0,00085	0,0041	0,0090
Co	0,00011	0,0080	0,0047	0,041	0,0089

Analytical methods applied:

Pb - atomic absorption;

Ag - atomic absorption;

Zn - atomic absorption;

Bi - atomic absorption, atomic absorption after co-precipitation on Fe(OH)₃;

Ni - atomic absorption;

Sn - spectrophotometric with phenylfluoran, atomic absorption, atomic absorption after separation on Fe(OH)₃;

Sb - atomic absorption, atomic absorption after separation on Fe(OH)₃;

As - atomic absorption, atomic absorption after separation on Fe(OH)₃;

Fe - atomic absorption, atomic absorption after separation on La(OH)₃;

Co - atomic absorption, extraction-photometry.

The chemical analyses have been carried out in three industrial laboratories and at the Institute of Non-Ferrous Metals.

The set consists of 5 reference materials in form of discs 40 mm in diameter and 30 mm in height.