INSTITUTE OF NON-FERROUS METALS

Analytical Chemistry Department
44-101 Gliwice, ul. Sowińskiego 5

CERTIFICATE OF ANALYSIS

MO 59, MO 60 lead brass

The average results of chemical analyses in wt %

No Element	WG 1	WG 2	WG 3	WG 4	WG 5	WG 6
Pb	0,71	2,66	2,29	1,41	1,66	3,70
Bi	0,0013	0,016	0,0057	0,014	0,0094	0,023
Mn	0,16	(0,0024)	0,037	0,12	0,074	0,21
Sn	0,29	(0,0025)	0,091	0,21	0,14	0,40
Fe	0,0084	0,42	0,31	0,10	0,18	0,18
Al	0,096	(0,00095)	0,041	0,073	0,058	0,020
Si	(0,0046)	(0,021)	—	(0,016)	—	(0,019)
Sb	(0,062)	(0,0024)	0,018	(0,042)	0,034	(0,0078)
Ni	0,20	0,0051	0,029	0,16	0,078	0,29
P	0,029	—	0,013	0,020	0,016	0,044
Cu	60,99	56,99	58,20	60,05	59,32	60,67
Zn	the rest	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

No / Element	WG 1	WG 2	WG 3	WG 4	WG 5	WG 6
Pb	0,018	0,056	0,038	0,012	0,018	0,030
Bi	0,00013	0,0013	0,00025	0,00053	0,00037	0,0022
Mn	0,0027	----	0,0018	0,0025	0,0019	0,0025
Sn	0,011	----	0,0016	0,014	0,0055	0,014
Fe	0,00034	0,0087	0,0055	0,0042	0,0039	0,0044
Al	0,0012	----	0,0019	0,0016	0,0016	0,0010
Si	----	----	----	----	----	----
Sb	----	----	0,0020	----	0,0018	----
Ni	0,0090	0,00036	0,0035	0,0061	0,0023	0,0064
P	0,0028	----	0,0017	0,0014	0,00085	----
Cu	0,11	0,12	0,08	0,059	0,063	0,16

Analytical methods applied:

Pb - atomic absorption, OES and XRF spectrometry:

Bi - atomic absorption after coprecipitation on Fe(OH)3, OES spectrometry;

Mn - atomic absorption, OES and XRF spectrometry;

Sn - atomic absorption, spectrophotometric with phenylfluoron, OES and XRF spectrometry;

Fe - atomic absorption directly and after coprecipitation on La(OH)3, OES and XRF spectrometry;

Al - spectrophotometric with ER, OES and XRF spectrometry;

Sb - extraction and spectrophotometric with molybdenum blue, OES spectrometry;

Ni - atomic absorption after electrolytic separation of copper, OES and XRF spectrometry, extraction and spectrophotometric with DMG

P - extraction and spectrophotometric with phosphomolybdate acid, OES and XRF spectrometry;

Cu - titration, electrolysis, XRF spectrometry.

The chemical analyses have been carried out in two laboratories including laboratory of the Institute of Non-Ferrous Metals using minimal three different methods. Lead brasses were made by melting of all components in the coreless induction furnace and by casting into special cast iron moulds preventing elimination of segregation of the components during solidification. The set consists of 6 reference materials in form of discs 40 mm in diameter and 25 mm in height.

All our Certified reference materials are produced as per ISO 34 guidelines.