



# INSTITUTE OF NON-FERROUS METALS

Analytical Chemistry Department

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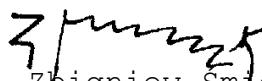
## CERTIFICATE OF ANALYSIS

Nickel-Brass MN65

The average results of chemical analysis in %

No. Element	WH1	WH2	WH3	WH4	WH5
Ni	5,70	6,34	3,44	4,14	4,89
Mn	0,53	0,36	0,25	0,11	0,011
Fe	0,0052	0,038	0,11	0,13	0,22
Si	0,010	0,038	0,072	0,12	0,17
P	0,0029	0,0072	0,013	0,015	0,017
Co	0,0061	0,017	0,031	0,048	0,028
C	(0,0046)	(0,0058)	(0,0070)	(0,0075)	(0,0087)
S	0,0055	0,0071	0,011	0,017	0,021
Cu	68,16	69,14	70,18	71,15	72,28
Zn	the rest				

Director of the Institute

  
Prof. Ph.D. Zbigniew Smieszek

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

No. Element	WH1	WH2	WH3	WH4	WH5
Ni	0,052	0,084	0,072	0,076	0,065
Mn	0,018	0,0099	0,0091	0,0061	0,00061
Fe	0,0001	0,0016	0,039	0,0041	0,0076
Si	0,0021	0,0019	0,0097	0,0046	0,0071
P	0,00040	0,00050	0,0028	0,00032	0,0021
Co	0,00022	0,00090	0,0013	0,0015	0,0012
C	-	-	-	-	-
S	-	-	-	-	-
Cu	0,062	0,11	0,11	0,034	0,12

Analytical methods applied:

- Ni - atomic emission spectrometry, atomic absorption spectrometry
- Mn - atomic emission spectrometry, atomic absorption spectrometry
- Fe - atomic emission spectrometry, atomic absorption spectrometry
- Si - gravimetric
- P - spectrophotometric, titration
- Co - atomic emission spectrometry, atomic absorption spectrometry
- C - method of combusting and infrared determination of CO<sub>2</sub>
- S - method of combusting and infrared determination of SO<sub>2</sub>, atomic emission spectrometry
- Cu - electrolysis, titration

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

Melts have been performed using induction furnace.

Homogeneity investigations were carried out using atomic emission spectrometry method with low voltage spark.

Homogeneity was estimated statistically with application of the test F. CRMs are in form of discs 40 mm in diameter and 2,5 mm height. Application of CRMs:

- Atomic emission spectrometry
- X-Ray spectrometry

CRMs are stable in time.