

Reference Material Certificate

614/05

Aluminum Base (Type of Standard)

Certified Values

Element	Mass content ¹⁾ in [%]	Uncertainty ²⁾ in [%]
Silicon (Si)	0.630	0.029
Iron (Fe)	0.246	0.008
Copper (Cu)	0.0299	0.0018
Manganese (Mn)	0.0518	0.0022
Magnesium (Mg)	0.616	0.024
Chromium (Cr)	0.0209	0.0010
Nickel (Ni)	0.0095	0.0008
Zinc (Zn)	0.0523	0.0024
Titanium (Ti)	0.0303	0.0014
Arsenic (As)	0.0033	0.0006
Bismuth (Bi)	0.0078	0.0005
Calcium (Ca)	0.0011 - 0.0014	0.0002
Cadmium (Cd)	0.0016	0.0002
Cobalt (Co)	0.0041	0.0004
Mercury (Hg)	0.0033	0.0006
Lithium (Li)	0.0003	0.0001
Sodium (Na)	0.0007 - 0.0011	0.0002
Phosphorus (P)	0.0032	0.0004
Lead (Pb)	0.0052	0.0006
Antimony (Sb)	0.0035	0.0005
Tin (Sn)	0.0055	0.0006
Vanadium (V)	0.0166	0.0010
Zirconium (Zr)	0.0016	0.0002

¹⁾ Unweighted mean value of the means of accepted sets of data (consisting of at least 5 but usually 6 single results), each set being obtained by a different digestion and / or method of measurement.

²⁾ The half width confidence interval C(95%) is an expression of the uncertainty of the certified value, where $C(95\%) = (t \times S_M / \sqrt{n})$ and "t" is the appropriate two sided Student's t value at the 95% confidence level for "n" acceptable mean values.

This certified reference material has elements with a range. Individually certified values for those elements are available on S-certificates only.

Manufacturing

This certified reference material for the analysis of aluminum and its alloys is produced using six strand hot top vertical continuous casting out of a single melt.

Homogeneity

Homogeneity testing is performed by means of spark emission spectroscopy. Tests involve making multiple measurements on individual samples taken at regular intervals along the entire length of each cast rod. Depending on the mass content of the element, the relative standard deviation of multiple measurements between discs or within one disc is typically found between 0.3% - 1% for alloying and other elements and 0.5% - 5% for trace elements.

Analysis Procedure

The values listed in this analysis certificate are the results of multiple analyses performed in our chemical analysis laboratory which is an accredited test facility for aluminum alloys according to the international standard ISO 17025. The analyses are based on validated wet chemical procedures.

Description of Sample

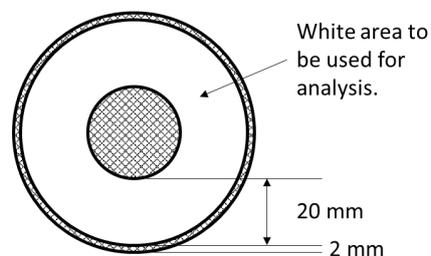
This reference material is available in the form of discs (approx. 60mm diameter and 26mm height)

Intended use and Stability

This certified reference material is primarily intended for use in spark optical emission spectroscopy. Other applications are X-ray fluorescence spectrometry (XRF) and classical wet chemical procedures. The minimum sample size for wet chemical analysis is 0.2g. The material will remain stable for the period given below (certification validity) if it is stored in a dry and clean environment at room temperature.

Instructions for Use

Calibration measurements should be made within a ring between 2mm and 22mm from the edge of the CRM face. For wet chemical analysis chips have to be prepared by turning or milling of the sample surface.



Traceability

Traceability of the certified mass contents to the SI (Système International d'Unités) is ensured by calibration using certified standard solutions or pure metals or substances of known stoichiometry.

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This certificate is valid until: Jul-2084