

Reference Material Certificate

116/04

Aluminium Base (Type of Standard)
Al pure (99.99-99.95% Al), Set 110

Certified Values

Element	Mass content [%]	Uncertainty [%]
Silicon (Si)	0.0111	± 0.0008
Iron (Fe)	0.0105	± 0.0008
Copper (Cu)	0.0070	± 0.0003
Manganese (Mn)	0.0051	± 0.0002
Magnesium (Mg)	0.0050	± 0.0004
Chromium (Cr)	0.0051	± 0.0003
Nickel (Ni)	0.0049	± 0.0004
Zinc (Zn)	0.0052	± 0.0004
Titanium (Ti)	0.0020	± 0.0002
Silver (Ag)	0.0020	± 0.0001
Arsenic (As)	0.0058	± 0.0005
Boron (B)	0.0004	± 0.0002
Barium (Ba)	<0.0001	
Beryllium (Be)	0.00028	± 0.00003
Bismuth (Bi)	0.0021	± 0.0003
Calcium (Ca)	(0.00007)	
Cadmium (Cd)	0.0011	± 0.0002
Cerium (Ce)	0.0011	± 0.0002
Cobalt (Co)	0.0020	± 0.0002
Gallium (Ga)	0.0048	± 0.0002
Mercury (Hg)	0.0004	± 0.0001
Indium (In)	0.0049	± 0.0003
Lanthanum (La)	0.0033	± 0.0002
Lithium (Li)	0.00011	± 0.00004
Molybdenum (Mo)	0.0076	± 0.0005
Sodium (Na)	<0.0001	
Phosphorus (P)	0.0019	± 0.0003
Lead (Pb)	0.0029	± 0.0003
Antimony (Sb)	0.0035	± 0.0006
Tin (Sn)	0.0031	± 0.0003
Strontium (Sr)	0.00085	± 0.00020
Vanadium (V)	0.0026	± 0.0002
Tungsten (W)	0.0015	± 0.0003
Zirconium (Zr)	0.0019	± 0.0002

The uncertainty reported is the result of standard deviation of all results multiplied with a factor of two and represents approximately the 95% confidence interval.

Values in brackets () are not certified but given for information only.

Manufacturing

This standard is produced using six strand hot top vertical continuous casting out of 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

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 aluminium alloys according to the international standard ISO 17025. The analyses are based on established wet chemical procedures.

Description of Sample

This reference material is available in the form of discs (approx. Ø 60 x 26 mm).

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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