

Reference Material Certificate

113/02

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

Certified Values

Element	Mass content [%]	Uncertainty [%]
Silicon (Si)	0.0012	± 0.0002
Iron (Fe)	0.0040	± 0.0004
Copper (Cu)	0.00020	± 0.00005
Manganese (Mn)	<0.0001	
Magnesium (Mg)	0.0004	± 0.0001
Chromium (Cr)	<0.0001	
Nickel (Ni)	<0.0001	
Zinc (Zn)	0.0002	± 0.0001
Titanium (Ti)	<0.0001	
Boron (B)	0.0100	± 0.0005
Beryllium (Be)	<0.0001	
Bismuth (Bi)	0.0005	± 0.0002
Calcium (Ca)	0.00010	± 0.00005
Cadmium (Cd)	<0.0002	
Cobalt (Co)	0.0005	± 0.0002
Gallium (Ga)	<0.0001	
Lithium (Li)	<0.00005	
Sodium (Na)	<0.0001	
Phosphorus (P)	0.0007	± 0.0002
Lead (Pb)	0.0007	± 0.0001
Antimony (Sb)	0.0007	± 0.0002
Tin (Sn)	0.0005	± 0.0002
Vanadium (V)	0.0006	± 0.0001
Zirconium (Zr)	0.0006	± 0.0001

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.

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

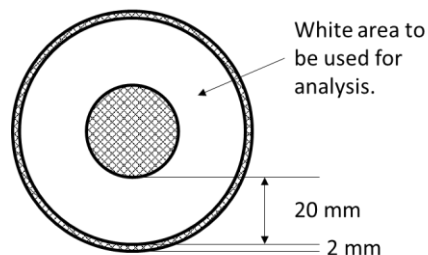
This reference material is available in the form of discs.

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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Date of certification: 3-Jul-1995
Certificate version 003: 04-Jan-2022
This certificate is valid until: Jul-2070