

## Reference Material Certificate

# 112/03

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

### Certified Values

Element	Mass content [%]	Uncertainty [%]
Silicon (Si)	0.00007	± 0.00003
Iron (Fe)	0.00006	± 0.00002
Copper (Cu)	<0.00004	
Manganese (Mn)	<0.00001	
Magnesium (Mg)	0.00005	± 0.00002
Chromium (Cr)	<0.00001	
Nickel (Ni)	<0.00001	
Zinc (Zn)	<0.00001	
Titanium (Ti)	<0.00001	
Silver (Ag)	<0.00001	
Arsenic (As)	0.000010	± 0.000005
Boron (B)	0.000010	± 0.000005
Barium (Ba)	<0.00001	
Beryllium (Be)	<0.00001	
Bismuth (Bi)	<0.00001	
Calcium (Ca)	<0.00001	
Cadmium (Cd)	<0.00001	
Cerium (Ce)	0.00005	± 0.00002
Cobalt (Co)	<0.00001	
Gallium (Ga)	<0.00001	
Mercury (Hg)	<0.00001	
Indium (In)	<0.00001	
Lanthanum (La)	0.000010	± 0.000005
Lithium (Li)	<0.00001	
Molybdenum (Mo)	<0.00001	
Sodium (Na)	<0.00001	
Phosphorus (P)	<0.00012	± 0.00005
Lead (Pb)	<0.00001	
Antimony (Sb)	0.00003	± 0.00001
Scandium (Sc)	<0.00001	
Selenium (Se)	<0.00001	
Tin (Sn)	<0.00001	
Strontium (Sr)	<0.00001	
Thallium (Tl)	<0.00001	
Vanadium (V)	<0.00001	
Tungsten (W)	<0.00001	
Zirconium (Zr)	<0.00001	

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 (approx. Ø 60 x 25 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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