

## Reference Material Certificate

# 114/03

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

### Certified Values

Element	Mass content [%]	Uncertainty [%]
Silicon (Si)	0.0034	± 0.0004
Iron (Fe)	0.0050	± 0.0005
Copper (Cu)	0.0018	± 0.0002
Manganese (Mn)	0.0019	± 0.0002
Magnesium (Mg)	0.0013	± 0.0002
Chromium (Cr)	0.0006	± 0.0002
Nickel (Ni)	0.0009	± 0.0002
Zinc (Zn)	<0.0002	
Titanium (Ti)	(0.0004)	
Silver (Ag)	<0.00005	
Arsenic (As)	<0.0001	
Boron (B)	0.017	± 0.001
Barium (Ba)	<0.0001	
Beryllium (Be)	<0.00005	
Bismuth (Bi)	0.0011	± 0.0002
Calcium (Ca)	(0.0001)	
Cadmium (Cd)	0.0031	± 0.0002
Cerium (Ce)	<0.0001	
Cobalt (Co)	0.00104	± 0.00010
Gallium (Ga)	0.0011	± 0.0002
Mercury (Hg)	<0.0001	
Indium (In)	<0.0001	
Lanthanum (La)	<0.0001	
Lithium (Li)	0.0002	± 0.0001
Molybdenum (Mo)	<0.0001	
Sodium (Na)	<0.0001	
Phosphorus (P)	0.0004	± 0.0002
Lead (Pb)	0.0017	± 0.0002
Antimony (Sb)	0.0021	± 0.0003
Selenium (Se)	0.00011	± 0.00005
Tin (Sn)	0.0012	± 0.0002
Strontium (Sr)	<0.0001	
Tantalum (Ta)	<0.0001	
Thallium (Tl)	<0.0001	
Vanadium (V)	0.00008	± 0.00004

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

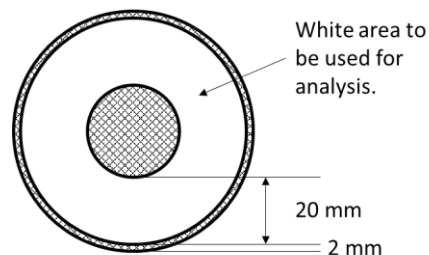
This reference material is available in the form of discs (approx. Ø 60 x 27 mm).

## 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.

Dr. Benedikt Moser  
CTO

Patrik Bachmann  
Head of Inorganic Analytics

Suisse Technology Partners Ltd.  
Querstrasse 5  
8212 Neuhausen am Rheinfall  
Switzerland

Phone: +41 52 551 11 00  
Fax : +41 52 551 11 99  
Email: [refmat@suisse-tp.ch](mailto:refmat@suisse-tp.ch)  
Internet: <https://reference-materials.ch>

Date of certification: 17-Feb-2011  
Certificate version 004: 12-Jan-2022  
This certificate is valid until: Feb-2086