

Reference Material Certificate

331/02

Aluminum Base (Type of Standard)
AlMn, Set 330

Certified Values

Element	Analytical Methods used for Certification	Mass content ¹⁾ in [%]	Uncertainty ²⁾ in [%]
Silicon (Si)	a, e	0.242	0.024
Iron (Fe)	a, b, e, f	0.515	0.007
Copper (Cu)	a, b, f	0.249	0.006
Manganese (Mn)	a, b, f	0.900	0.020
Magnesium (Mg)	a, b, f	0.0430	0.0008
Chromium (Cr)	a, b, f	0.195	0.003
Nickel (Ni)	a, b, c, f	0.0332	0.0010
Zinc (Zn)	a, b, c, f	0.0188	0.0005
Titanium (Ti)	a, b, c, e, f	0.0540	0.0011
Sodium (Na)	b, f	(0.0002)	
Lead (Pb)	b, c, f	0.0044	0.0002
Vanadium (V)	a, b, c, f	0.0263	0.0007
Zirconium (Zr)	a, b, c	0.138	0.005

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.

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

Analytical Methods used for Certification:

- a ICP-OES, digestion with caustic soda
- b ICP-OES, digestion with acid
- c ICP-MS, digestion with acid
- d ICP-MS, closed vessel digestion with acid
- e Spectrophotometry
- f FAAS, digestion with acid

Abbreviations:

- ICP-OES – Inductively coupled plasma - optical emission spectrometry
- ICP-MS – Inductively coupled plasma - mass spectrometry
- FAAS – Flame atomic absorption spectrometry

Manufacturing

This certified reference material for the analysis of aluminum and its alloys is produced using double strand horizontal 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.

Description of Sample

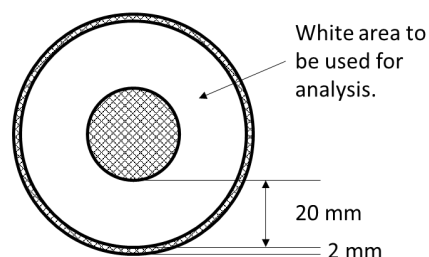
This reference material is available in the form of discs (approx. 65mm diameter and 25mm height)

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.

Dr. Benedikt Moser
CTO

Patrik Bachmann
Head of Chemical 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
Internet: <https://reference-materials.ch>

Date of certification: 07-Jun-2019
Certificate version 002: 12-Jan-2022
This certificate is valid until: Jun-2094