TAZ GMBH

Certificate

Certified Reference Material (CRM)

TAZ-047

AlNi1Fe0.8

Certified Values

Element	Mass fraction [1]	Uncertainty [2]	Unit [3]	Element	Mass fraction [1]	Uncertainty [2]	Unit [3]
Si	0.0313	0.0030	%	Cr	8	2	µg/g
Fe	0.753	0.023	%	Ti	16	8	µg/g
Ni	1.091	0.029	%	Ce	<10		µg/g
Zn	0.106	0.004	%	Mo	<10		µg/g
Pb	0.0128	0.0028	%	Sr	<2		µg/g
Cu	27	5	µg/g	V	20	2	µg/g
Mn	62	5	µg/g	Zr	4	2	µg/g
Mg	35	6	µg/g	Sn	43	10	µg/g

[1] Unweighted mean values of the accepted data set mean values, whereby the data sets originate from different laboratories.

[2] Expanded uncertainty U_{CRM} corresponding to a confidence level of 95 %.

[3] Although widely accepted in the industry, the "mass fraction in %" is neither an SI- nor an IUPAC-supported unit. Multiplying the certified values and uncertainties by 10^4 yields the values in µg/g.

Information Values [4]

Element	Mass fraction [1]	Unit	Element	Mass fraction [1]	Unit
Ga	38	µg/g	Cd	4	µg/g
Co	21	µg/g	Sb	<10	µg/g
Bi	<10	µg/g	B	4	µg/g
Ca	<12	µg/g			

[4] The values were not certified, but given for information if the number of accepted data sets was less than three, the uncertainty of the characterization was significantly larger than expected or it was not possible to confirm the homogeneity beyond doubt.

Description of the Material

The reference material is available in the form of cylinders with a diameter of 39 mm and a height of approx. 41 mm.

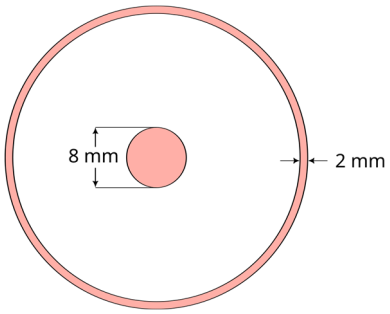
Intended Use

The reference material is intended for establishing and checking calibrations for Spark-Optical Emission Spectrometry (S-OES) for the analysis of samples of similar composition and to demonstrate traceability.

TAZ GMBH

Instructions for Use

As significant segregation can occur in the centre of cast disc samples, an area of 8 mm diameter in the centre of the sample should not be used. The outer surface up to a depth of 2 mm should also be omitted from the analysis. The samples can be used up to a residual height of 10 mm. The surface of the sample to be analysed should not be used as delivered, but only after the surface has been prepared so that any protective layers are removed. Preparation should be carried out by turning, milling or grinding. At least three individual sparks should be used for an analysis.



Transport and Storage

The material must be stored in a dry and clean environment at room temperature. Transportation must be carried out under normal ambient conditions. The sample remains stable as long as it is not exposed to extreme heat (e.g. during surface treatment).

End of Validity

The material is known to be stable. Therefore, the certificate will remain valid until it is revoked by the manufacturer of the reference material on the basis of new evidence.

Homogeneity

A homogeneity assessment according to ASTM E826-14 and ISO 33405:2024 was carried out by TAZ GmbH using Spark-Optical Emission Spectrometry (S-OES) to determine the batch inhomogeneity.

Estimation of Uncertainty

The estimation of uncertainty takes into account the results of the homogeneity assessment and the characterization study. u_{hom} is obtained from the contributions of the homogeneity assessment between the units u_{bu} and within the units u_{wu}. u_{char} is the standard uncertainty of the characterization study, which results from the standard deviation s_{char} and the number n of accepted data set mean values. u_{CRM} is the combined uncertainty of the homogeneity assessment and the characterisation study. The coverage factor $t_{(n-1)}$ is the two-sided quantile of the Student t-distribution and U_{CRM} is the expanded uncertainty. The reported uncertainties and the certified values have been rounded according to DIN 1333:1992.

$$u_{hom}=\sqrt{u_{bu}^2+u_{wu}^2} \qquad u_{char}=\frac{s_{char}}{\sqrt{n}} \qquad u_{CRM}=\sqrt{u_{char}^2+u_{hom}^2} \qquad U_{CRM}=t_{(n-1)}\cdot u_{CRM}$$

Metrological Traceability

The analytical values are traceable to the SI (Système International d'Unités) via calibration using pure metals, certified reference materials or the controlled commercial standards listed below:
5010 AE, BAM 310, BAM-M313a, BAM-M315, BAM-M323, BAM-M326, ERM-EB312a, ERM-EB316, Hydro 2104-2, MBH GG77J2B, BAM-M308a, STP 116/05, STP 117/04, STP 117/04, STP 254/01, STP 412/01, STP 413/04 81, STP 442/04, STP 473/02, STP 515/01, TAZ-036.

Laboratories involved in characterisation	Accreditation
GWP mbH Gesellschaft für Werkstoffprüfung München, Zorneding, DE	DIN EN ISO/IEC 17025:2018-03
Łukasiewicz Research Network – Institute of Non-Ferrous Metals Division, Laboratory of Metal Science and Chemical Analysis, Skawina, PL	PN-EN ISO/IEC 17025:2018-02
SPC Werkstofflabor GmbH, Westhausen, DE	DIN EN ISO/IEC 17025:2018-03
W.S. Werkstoff Service GmbH, Essen, DE	DIN EN ISO/IEC 17025:2018-03
Zentrallabor GmbH Leipzig, Leipzig, DE	DIN EN ISO/IEC 17025:2018-03
Zentrallabor Siegerland Braun & Co., Freudenberg, DE	DIN EN ISO/IEC 17025:2018-03
TAZ Gesellschaft für Analyse und Meßtechnik mbH, Aichach, DE	DIN EN ISO/IEC 17025:2018-03

TAZ GMBH

Mean values of accepted data sets

	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ce	Mo	Sr	V	Zr	Pb	Sn
No.	%	%	µg/g	µg/g	µg/g	µg/g	%	%	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	%	µg/g
1	0.026	0.709	21	51	---	---	1.04	0.100	---	2	<5	<1	---	1.5	0.0092	30
2	0.029	0.744	23	57	29	6.5	1.04	0.103	12	<10	<10	<1	19.1	2.8	0.0121	44
3	0.030	0.745	25	60	30	7.0	1.09	0.104	12	<15	10	1.0	20.0	<3	0.0126	45
4	0.030	0.748	25	61	34	8.0	1.09	0.107	14	<20		<1	20.0	4.4	0.0147	45
5	0.030	0.751	28	63	37	8.2	1.10	0.107	14			<1	20.0	5.0	0.0152	53
6	0.031	0.757	30	63	38	9.5	1.11	0.107	22			<1	20.2	5.4		
7	0.036	0.773	35	69	43	10.7	1.13	0.112	25			2.0	21.8	---		
8	0.037	0.800	---	70	---	---	1.13	---	---				---	---		
M	0.031	0.753	27	62	35	8.3	1.09	0.106	16			1.5	20.2	3.8	0.0128	43
s_M	0.004	0.026	5	7	6	1.6	0.04	0.004	6			0.8	1.0	1.7	0.0024	9
$\bar{s}_i$	0.001	0.005	3	2	1	0.9	0.01	0.001	1			0.0	0.6	0.9	0.0004	1

	Ga	*Co*	*Bi*	*Ca*	*Cd*	*Sb*	*B*
No.	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*	*µg/g*
1	*30*	*13*	*1*	*3*	*3.5*	*2.3*	*2.5*
2	*37*	*20*	*7*	*3*	*4.2*	*<3*	*4.3*
3	*47*	*21*		*11*	*4.3*	*6.3*	*5.1*
4		*30*					
M	*38*	*21*	*4*	*6*	*4.0*	*4.3*	*4.0*
s_M	*9*	*7*	*5*	*5*	*0.5*	*2.9*	*1.4*
$\bar{s}_i$	*0*	*1*	*2*	*0*	*0.2*	*0.0*	*0.4*

All data were obtained using Spark-Optical Emission Spectrometry (S-OES). The laboratory values were analysed statistically in order to eliminate outliers. If "---" appears in the table, this means that an outlier has been excluded. A data set consists of at least 6 individual values. Figures in italics are non-certified values for information purposes.

M: mean value of the data set values
s_M: Standard deviation of the data set mean values
$\bar{s}_i$: averaged standard deviation of repeatability (square root of the mean value of the data set variances)

Accepted as TAZ CRM (Rev. 0) on 13 March 2026

Moritz Winter, M.Sc.
Head of Reference Materials Production

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-RM-11169-02-00

This certified reference material was manufactured in accordance with DIN EN ISO 17034 in combination with DIN EN ISO/IEC 17025. TAZ GmbH is accredited as a reference material producer according to DIN EN ISO 17034. The accreditation is valid for the scope specified in the annex to the accreditation certificate D-RM-11169-02-00. The Deutsche Akkreditierungsstelle (DAkkS) is a signatory of the Multilateral Agreement (MLA) between EA, ILAC and IAF for mutual recognition.

TAZ Gesellschaft für Analyse und Meßtechnik mbH
Joseph-von-Fraunhofer-Str. 4
86551 Aichach, Germany

Phone: +49 (0)8205 518 40 10
Mail: info@tazgmbh.de
Web: tazgmbh.de - referenzproben.com

- End of the Certificate -