TAZ GMBH

Certificate

Certified Reference Material (CRM)

TAZ-013a

X153CrMoV12 / 1.2379

Certified Values

Element	Mass fraction [1]	Uncertainty [2]	Unit [3]	Element	Mass fraction [1]	Uncertainty [2]	Unit [3]
C	1,60	0,04	%	Co	0,0189	0,0021	%
Si	0,292	0,012	%	Cu	0,070	0,010	%
Mn	0,327	0,010	%	V	1,01	0,05	%
P	0,0207	0,0024	%	W	0,022	0,004	%
S	0,0026	0,0011	%	Sn	0,0044	0,0009	%
Cr	12,0	0,4	%	B	0,00032	0,00021	%
Mo	0,752	0,015	%	N	0,0233	0,0029	%
Ni	0,381	0,012	%	Fe	83,4	0,8	%
Al	0,0187	0,0013	%				

[1] The assigned values were obtained by value transfer from a reference material to a closely matched candidate reference material using a single measurement procedure performed by one laboratory.

[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.

This certificate is valid until December 2055.

Information Values [4]

Element	Mass fraction [1]	Unit
Nb	129	µg/g
Ti	<50	µg/g
Pb	<50	µg/g
As	31	µg/g

[4] The values were not certified, but given for information where the homogeneity could not be evaluated, the uncertainty was significantly higher than expected or the value transfer was not possible with the available reference material.

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Description of the Material

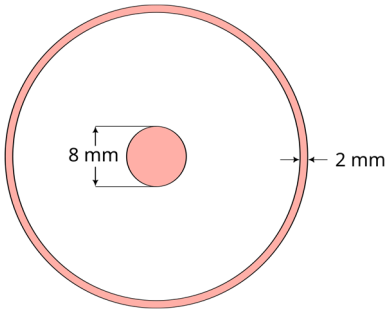
The reference material is available in the form of cylinders with a diameter of 45 mm and a height of approx. 40 mm.

Intended Use

The reference material is intended for establishing and checking calibrations for X-ray fluorescence analysis, glow discharge and spark optical emission spectrometry for the analysis of samples of similar composition.

Instructions for Use

As there can be significant segregation 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 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).

Homogeneity

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

Estimation of Uncertainty

The estimation of uncertainty takes into account the results of the homogeneity assessment, the characterization study and the uncertainty of the certified values of the used CRM. 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 mean differences between the used reference material and the candidate material. u_{CRM} is the combined uncertainty of the homogeneity assessment, the characterisation study and the standard uncertainty of the used CRM $u_{CRM,used}$. The coverage factor is $k = 2$ and U_{CRM} is the expanded uncertainty. The reported uncertainties and the certified values have been rounded according to DIN 1333:1992.

$$u_{hom}=\sqrt{u_{bu}^2+u_{wu}^2} \qquad u_{char}=\frac{s_{char}}{\sqrt{n}} \qquad u_{CRM}=\sqrt{u_{char}^2+u_{hom}^2+u_{CRM,used}^2} \qquad U_{CRM}=k\cdot u_{CRM}$$

Characterisation

The measurements for the characterisation were carried out by TAZ GmbH using optical emission spectrometry with spark excitation (S-OES).

Traceability

The certified values are traceable to the SI (Système international d'unités) via the used CRM BS 37H.

Accepted as TAZ CRM (Rev. 0) on 15 December 2025

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

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.

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Deutsche Akkreditierungsstelle D-RM-11169-02-00

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