



**Innovative Solutions in Chemistry, S.L. (ISC Science)**

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# CERTIFIED REFERENCE MATERIAL

## Certificate of analysis

No. CA-CRM-DW2-X

Material name:

Elements (29) in drinking water



Certified Reference Material code: CRM-DW2

Batch number: 20230329

Unit: X

### Material description

This Certified Reference Material (CRM) corresponds to 250 mL of elements (29) in drinking water using an appropriate polypropylene bottle. The material provided is prepared gravimetrically from multielemental standard solutions spiked until the certified concentration values stated below to a drinking water matrix according to ISO 17034. Sub-boiling distilled high-purity acid has been used to place the material in solution and to stabilize the material (0,5% HNO<sub>3</sub>).

### Intended use

According to ISO 17025 and ISO Guide 33, this material can be used to validate methods, determination of the element concentration and precision and/or bias control.

### Value calculation

Certified concentration values are based on gravimetric preparation and verified according to ISO 17034 and ISO/IEC 17025 by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) using two methods of demonstrable accuracy in one laboratory. The expanded uncertainty stated for each certified value was calculated as  $U = 2 \cdot u$ , where  $k = 2$  is the coverage factor for a 95% confidence interval and  $u$  is the combined standard uncertainty calculated according to ISO Guide 35. The value of  $u$  is intended to represent the combined effect of uncertainty components associated with weighting of methods, density determination and homogeneity and stability studies.

Stability of this material is based upon rigorous long-term (storage conditions) and short-term (transport conditions) testing of the solution for the certified values according to ISO 17034 and ISO Guide 35. This testing includes, but is not limited to, the effect of temperature. This material will be monitored at ISC-Science and customers will be notified of any changes in the certified values.

### Metrological traceability statement

Certified concentration values were assigned by using two internal methods and are traceable to a higher-order CRM through an unbroken chain of comparisons to appropriate standards with suitable procedure and measurement uncertainties:

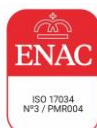
A. Analytical balance  
-The balance is calibrated yearly by ISO 17025 accredited laboratories and is verified daily by an in-house method using standard weights.

B. Standards

The standards used for the validation of the internal methods and the characterization of the material are traceable to a Certified Reference Material provided by an ISO 17034 accredited Reference Material Producer who verified it against the NIST stated for each element (see - Table 1. Traceability -).

C. Density

The density used to adjust the values obtained from the internal methods is calibrated by ISO 17025 accredited laboratories.



ISC Science is a Reference Material Producer accredited by ENAC with accreditation no. 3/PMR004  
ENAC is a signatory to the EA and ILAC Multilateral Agreements for Reference Material Producers



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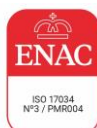
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### Certified concentration value of the elements

Table 1: Certified values

Element	Concentration	U (k=2)	Units	Traceability
Ag	22.9	1.8	µg/L	NIST 3151
Al	193.5	14.1	µg/L	NIST 3101a
As	9.86	0.57	µg/L	NIST 3103a
B	1400	138	µg/L	NIST 3107
Ba	40.9	2.8	µg/L	NIST 3104a
Be	4.93	0.43	µg/L	NIST 3105a
Ca	64.6	5.2	mg/L	NIST 3109a
Cd	4.84	0.27	µg/L	NIST 3108
Co	4.56	0.24	µg/L	NIST 3113
Cr	23.0	1.5	µg/L	NIST 3112a
Cu	1855	104	µg/L	NIST 3114
Fe	186.5	13.1	µg/L	NIST 3126a
K	5.21	0.50	mg/L	NIST 3141a
Li	11.0	1.4	µg/L	NIST 3129a
Mg	9.90	0.82	mg/L	NIST 3131a
Mn	45.6	3.7	µg/L	NIST 3132
Mo	4.83	0.42	µg/L	NIST 3134
Na	195.1	13.4	mg/L	NIST 3152a
Ni	19.1	1.4	µg/L	NIST 3136
Pb	4.75	0.37	µg/L	NIST 3128
Sb	10.43	0.75	µg/L	NIST 3102a
Se	19.8	1.7	µg/L	NIST 3149
Sn	19.5	1.5	µg/L	NIST 3161a
Sr	30.7	2.3	µg/L	NIST 3153a
Ti	19.3	1.8	µg/L	NIST 3162a
Tl	4.58	0.43	µg/L	NIST 3158
U	29.9	2.4	µg/L	NIST 3164
V	4.82	0.28	µg/L	NIST 3165
Zn	97.0	9.6	µg/L	NIST 3168a



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### Expiration of certification

The expiration date is guaranteed to be valid for 12 months from the certificate issue date provided.

Certificate issue date (dd/mm/yyyy): xx/xx/xxxx

Expiration date: xx/xx/xxxx

During the period of validity, the producer ISC-Science will notify to purchaser any substantial changes in the stability of this product.

### Packing and storage conditions

To maintain the integrity of this material, the solution should be kept tightly closed and stored in the dark under normal laboratory conditions in its original packaging.

### Instructions for use and safety conditions

This material is confirmed homogeneous, the recommended minimum sample size is 2 mL. For safety information, check Safety Data Sheet.

#### **Content verified by:**

*Giuseppe Centineo*

*(I+D+i Manager)*

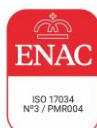
#### **Format verified by:**

*Patricia de los Santos Álvarez*

*(General Quality Manager)*

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