

## Specification – Certified Reference Material

### Element ICP Standard Solution 10 000 mg/l

#### Accreditation:



Deutsche  
Akkreditierungsstelle  
D-RM-15185-01-00

Merck KGaA, Darmstadt, Germany is accredited by the German accreditation authority as registered reference material producer (D-RM-15185-01-00) in accordance with **ISO 17034**.

<b>Producer:</b>	Merck KGaA, Frankfurter Str. 250, 64293 Darmstadt, Germany
<b>Description of CRM:</b>	Element ICP Standard Solution 10 000 mg/l
<b>Expiry date:</b>	4 years
<b>Storage:</b>	+15°C to +25°C tightly closed in the original container
<b>Specification:</b>	9086 – 9948 mg/kg

Article	Analyte	Description of CRM	Associated uncertainty*, $U=k \cdot u$ ( $k=2$ ) as mass fraction
1.70371	Al	Aluminium ICP Standard	± 60 mg/kg
1.70373	Ca	Calcium ICP Standard	± 60 mg/kg
1.70374	Cr	Chromium ICP Standard	± 60 mg/kg
1.70375	Co	Cobalt ICP Standard	± 60 mg/kg
1.70378	Cu	Copper ICP Standard	± 60 mg/kg
1.70376	Fe	Iron ICP Standard	± 70 mg/kg
1.70372	Pb	Lead ICP Standard	± 60 mg/kg
1.70379	Mg	Magnesium ICP Standard	± 60 mg/kg
1.70380	Mn	Manganese ICP Standard	± 60 mg/kg
1.70384	Hg	Mercury ICP Standard	± 80 mg/kg
1.70382	Ni	Nickel ICP Standard	± 70 mg/kg
1.70383	P	Phosphorus ICP Standard	± 70 mg/kg
1.70377	K	Potassium ICP Standard	± 60 mg/kg
1.70386	Si	Silicon ICP Standard	± 60 mg/kg
1.70381	Na	Sodium ICP Standard	± 60 mg/kg
1.70385	S	Sulfur ICP Standard	± 70 mg/kg
1.70388	V	Vanadium ICP Standard	± 60 mg/kg
1.70389	Zn	Zinc ICP Standard	± 60 mg/kg
1.70390	Zr	Zirconium ICP Standard	± 60 mg/kg

\* The uncertainty can vary depending on the primary reference material.



**Metrological traceability:** Directly traceable to the corresponding / suitable primary standard NIST SRM  
*NIST: National Institute of Standards and Technology, Gaithersburg, USA*

**Measurement method:** Inductively coupled plasma optical emission spectrometry ICP-OES.

**Intended use:** This certified reference material is intended for use as a calibration standard in element analysis.

**Associated uncertainty:**

The associated uncertainty  $U_{\text{CRM}}$  reported with the certified values is calculated as combined expanded uncertainty  $U_{\text{CRM}}=k \cdot u_{\text{CRM}}$  in accordance with GUM and EA-4/02, with  $k=2$  as the coverage factor for a 95% coverage probability.

The combined uncertainty  $u_{\text{CRM}}$  is derived from combination of the squared uncertainty contributions:

$$u_{\text{CRM}} = \sqrt{u_{\text{characterisation}}^2 + u_{\text{homogeneity}}^2 + u_{\text{stability}}^2}$$

**$u_{\text{characterisation}}$ :** is the uncertainty in accordance with DIN EN ISO/IEC 17025 which includes the contributions of the primary reference material and the measuring system. The characterisation measurements have been conducted by our DAkkS accredited calibration laboratory.

**$u_{\text{homogeneity}}$ :** is the between-bottle variation in accordance with ISO 17034. The assessment of homogeneity is performed by analysis of a representative number of systematically chosen sample units.

**$u_{\text{stability}}$ :** is the uncertainty obtained from short-term and long-term stability in accordance with ISO 17034. The stability studies are the basis for the quantification of the expiry date of this reference material for the unopened bottle.

**Detailed information is provided by the certificates and the certification report on our website.**

