



5824

ISO 17034 accredited

Certificate of Calibration

Code: COFCAL

Certificate Number: KL123456

Calibration and Issue Date: 01/08/2021

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Description:

**Copper 1000 ppm
element reference solution**

Category & Code:

ROMIL PrimAg[®]-xtra

E3CU6

Specification:

Cu AW 63.55

1000 ppm as Cu

Solute: Cu metal

Matrix: HNO3 0.5M

Application: AA, ICP, IC and ISE calibration

Batch Number:

KL123456

Certificate Validity:

Expiry: Nov 2022

Calibration Result:

1000.2 ppm m/v @ 20°C

(ppm m/v ≡ mg/L)

Expanded Uncertainty:

± 2.1 ppm

Traceability:

Ag primary rm

Calibrated Density:

1.0167 g/ml @ 20°C

Expanded Uncertainty:

0.0003 g/ml

Impurity Information (ppb):

unaccredited

Ag	<0.1	Eu	<0.1	Na	<0.1	Sn	0.1
Al	<0.1	Fe	<0.1	Nb	<0.1	Sr	<0.1
As	0.4	Ga	<0.1	Nd	<0.1	Ta	<0.1
Au	<0.1	Gd	<0.1	Ni	<0.1	Tb	<0.1
B	<0.1	Ge	<0.1	Os	<0.1	Te	<0.1
Ba	0.1	Hf	<0.1	Pb	0.1	Th	<0.1
Be	<0.1	Hg	0.9	Pd	5.9	Ti	0.5
Bi	0.1	Ho	<0.1	Pr	<0.1	Tl	<0.1
Ca	<0.1	In	<0.1	Pt	<0.1	Tm	<0.1
Cd	<0.1	Ir	<0.1	Rb	<0.1	U	<0.1
Ce	<0.1	K	13.2	Re	<0.1	V	<0.1
Co	<0.1	La	<0.1	Rh	2.7	W	<0.1
Cr	<0.1	Li	0.1	Ru	<0.1	Y	<0.1
Cs	<0.1	Lu	<0.1	Sb	<0.1	Yb	<0.1
Cu		Mg	<0.1	Sc	<0.1	Zn	1.1
Dy	<0.1	Mn	<0.1	Se	1.1	Zr	<0.1
Er	<0.1	Mo	<0.1	Sm	<0.1		

Elemental impurities were determined by ICP-MS on the solution as prepared. Values reported are raw data with no estimation made for uncertainty or spectrographic interferences. A 'less than' value (<) means 'not detected'. Impurity levels are supplied for information only and should not be used as calibration data.

Approved Signatory:

Name

Title

Signature



Generated from a master computer file which has been authorised by the signatory.



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Background Information

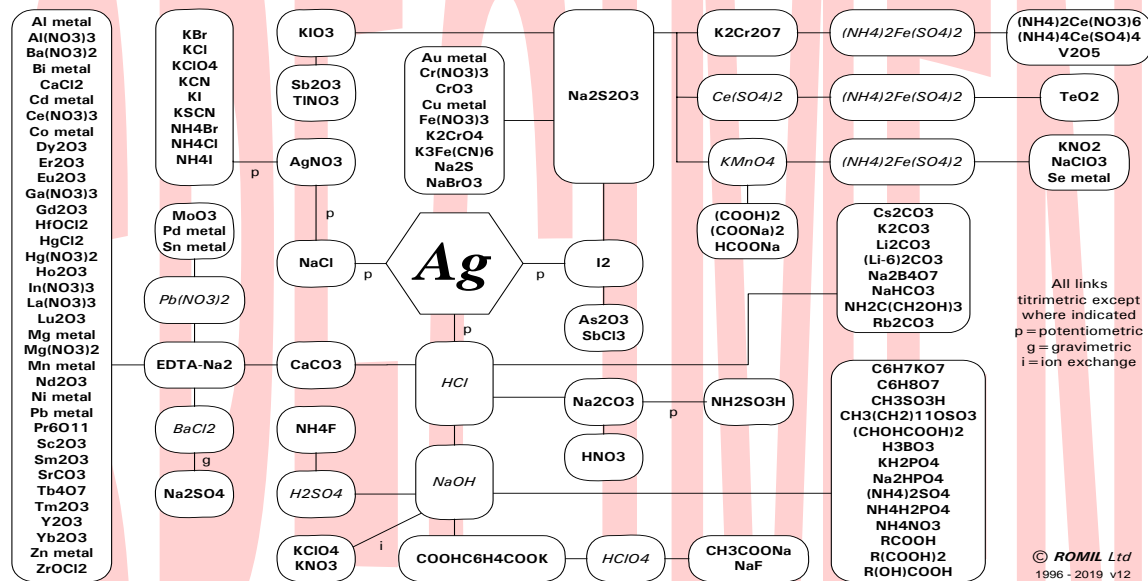
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Traceability:

This certificate is issued in accordance with the reference material producer accreditation requirements to ISO 17034 of the United Kingdom Accreditation Service (UKAS). It provides SI-traceability of measurement to the mole realised by an in-house silver or platinum primary reference material as appropriate or to other recognised national standards. UKAS is one of the signatories to the Multilateral Agreement of the European co-operation for Accreditation (EA) as well as the International Laboratory Accreditation Cooperation (ILAC) Arrangement for the mutual recognition of calibration certificates issued by accredited entities.

Traceability Scheme to Primary Silver:

Accredited by UKAS to ISO 17025 as a calibration laboratory, accreditation number 0658.



Calibration Result & Expanded Uncertainty:

Calibrations are performed in the company's laboratories. For those calibrations detailed in the traceability scheme to primary silver, the reported calibration result has been established by high precision titrimetric and/or gravimetric analysis by classical methods. Platinum calibration results have been established by high precision thermogravimetric analysis and ICP-MS. All calibrations use certified class A volumetric glassware, certified balances and certified thermometers. Balances are calibrated with weights traceable to units of measurement realised at the National Physical Laboratory, UK. Thermometers are traceable to units of temperature measurement realised at the National Physical Laboratory, UK. For other calibrations the reported calibration result has been established by traceability to CRMs provided by recognised national metrology institutes.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with ISO 17034 requirements, based on measurement, preparation and stability within the certification validity period.

Preparation & Packaging:

This reference material has been prepared in a controlled laboratory environment from high purity chemical ingredients, mixed gravimetrically or volumetrically as appropriate, then packed into suitable containers. The process has been validated for homogeneity and absence of significant packaging effects such as transpiration through in-house studies.

Storage & Handling:

Keep tightly closed in the original container with the original closure. Store at 15-25°C under normal ambient laboratory conditions unless otherwise indicated on the container label and/or product specification. To maintain homogeneity of liquids, mix thoroughly before use. Do not return dispensed material to the original container.

Other Information:

This certificate may not be reproduced other than in full, except with the prior written approval of ROMIL Ltd. PrimAg is a registered trademark of ROMIL Ltd.