

# Certificate of Analysis

## Product Description:

Name: Quality Control Standard 21  
Part Number: **QCS-21**  
Lot Number: **SAMPLE**  
Matrix: 4% HNO<sub>3</sub> + Tr HF  
Purity: 99.95% - 99.9999%

## Certified Values:

Element	(µg/mL)	SRM ID	SRM Lot#	Element	(µg/mL)	SRM ID	SRM Lot#
Sb	100 ± 1	*		Mg	100.0 ± 0.6	3131a	140110
As	100 ± 1	3103a	100818	Mn	100.0 ± 1.5	3132	050429
Be	100 ± 1	3105a	090514	Mo	100 ± 1	3134	891307
Cd	100.0 ± 0.6	3108	130116	Ni	100.0 ± 0.6	3136	120619
Ca	100.0 ± 0.6	3109a	130213	Se	100 ± 1	3149	100901
Cr	100.0 ± 0.6	3112a	030730	Sr	100.0 ± 0.6	3153a	990906
Co	100.0 ± 0.6	3113	000630	Tl	100.0 ± 0.6	3158	993012
Cu	100.0 ± 0.6	3114	121207	Ti	100 ± 1	3162a	130925
Fe	100.0 ± 0.6	3126a	140812	V	100 ± 1	3165	992706
Pb	100 ± 1	3128	101026	Zn	100.0 ± 0.6	3168a	120629
Li	100 ± 1	3129a	100714				

The Certified values are based on gravimetric and volumetric preparation, and verified against SRM 3100 series via inductively coupled plasma optical emission spectrometry (ICP-OES) using an internal laboratory developed method. The uncertainty in the certified value is calculated for a 95% confidence interval and coverage factor *k* is about 2.

\* Refer to Traceability Information, Section d

**Density:** 1.030 g/mL ± 0.002 g/mL @ 22.3°C

## Preparation Information:

The standard is generally manufactured from CRM single element solutions that were prepared using the methods developed at NIST for SRM Spectrometric Standard Solutions under appropriate laboratory conditions. Sub-boiling distilled high-purity acid has been used to place the materials in solution and to stabilize the standard. The matrix is as noted above in 18 megaohm deionized water.

Stability of this product is based upon rigorous short term and long term testing of the solution for the certified value. This testing includes, but is not limited to, the effect of temperature and packaging on the product.

## Intended Use:

The CRM is intended for use as a calibration standard and QC control for instruments such as ICPOES, ICPMS, AAS and XRF, and validation of analytical methods. It also can be used in EPA, ASTM and other methods.

## Traceability Information:

The traceability of this standard is maintained through an unbroken chain of comparisons to appropriate standards with suitable procedure and measurement uncertainties. The maintenance of the base and derived units of International System of Units (SI) with traceability of measurement results (contemporary metrology) to SI ensures their comparability over time as follows.

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High-Purity Standards is certified to ISO 9001:2008 and accredited to ISO/IEC 17025:2005 and ISO Guide 34:2009.

a. **Standard Weight and Analytical Balance**

The standard weights (NBS weights Inventory No 20231A) are calibrated every two years by South Carolina Metrology Laboratory that is a participant in "NIST Weights and Measures Measurement Assurance Program" with a certificate of measurement traceability to NIST primary standards.

The balances are calibrated yearly by the ISO 17025 accredited metrology service, and are verified weekly by an in-house method using standard weights.

b. **Volumetric Device**

The calibration of volumetric vessels is checked annually using the ASTM method E542.

c. **Thermometer**

The standard thermometers are calibrated every year by the ISO 17025 accredited metrology service. The thermometers used in-house are verified against the standard thermometers yearly.

d. **Calibration Standards**

The Calibration Standards are traceable to SRM 3100 Series Spectrometric Standard Solutions or second sources.

**Packaging and Storage Conditions:**

The standard is packaged in a pre-cleaned polyethylene bottle. To maintain the integrity of this product, the solution should be kept tightly capped and stored under normal laboratory conditions.

**Refer to Material Safety Datasheet (MSDS) for hazardous information.**

**Expiration Information:**

The expiry date is guaranteed to be valid for twelve months from the shipping date provided. For this reason, standards from the same lot may have different expiration dates.

**Preparation Date: June 22, 2015**

**Shipped Date:**

**Expiration Date:**

**Certificate Issue Date: July 7, 2015**

**Quality Information:**



**ISO/IEC 17025:2005 Accreditation  
Certificate Number AT-1529**



**Angel Sellers  
Quality Manager**



**ISO Guide 34:2009 (RMP) Accreditation  
Certificate Number AR-1436**

NOTICE: HPS products are intended for laboratory use only. All products should be handled and used by trained professional personnel. The responsibility for the safe handling and use of these products rests solely with the buyer and/or user. The data and information as stated was furnished by the manufacturer of the product. The information provided in this certificate pertains only to the lot number specified. None of the information provided in this certificate may be used, reproduced or transmitted in any form or by any means without written approval from High Purity Standards.