

Certificate of Analysis

Multi-element Calibration Standard 1

Agilent Part Number: 8500-6944
Lot Number: 3-121MKBY2

| Analyte | CAS# | Labeled Conc. | Measured Conc. | SRM | Start Mat'l Formula | Start Mat'l Purity | Analyte | CAS# | Labeled Conc. | Measured Conc. | SRM | Start Mat'l Formula | Start Mat'l Purity |
|---------|-----------|---------------|----------------|--------|--|--------------------|---------|-----------|---------------|----------------|--------|--|--------------------|
| Ce | 7440-45-1 | 10.0 µg/mL | 9.90 µg/mL | 3110* | Ce ₂ (CO ₃) ₃ ·x(H ₂ O) | 99.99+ | Pr | 7440-10-0 | 10.0 µg/mL | 10.0 µg/mL | 3142a* | Pr ₂ O ₃ | 99.99+ |
| Dy | 7429-91-6 | 10.0 µg/mL | 9.90 µg/mL | 3115a* | Dy ₂ O ₃ | 99.99+ | Sc | 7440-20-2 | 10.0 µg/mL | 9.84 µg/mL | 3148a* | Sc(NO ₃) ₃ ·4H ₂ O | 99.99+ |
| Er | 7440-52-0 | 10.0 µg/mL | 9.92 µg/mL | 3118a* | Er ₂ O ₃ | 99.99+ | Sm | 7440-19-9 | 10.0 µg/mL | 9.88 µg/mL | 3147a* | Sm ₂ O ₃ | 99.99+ |
| Eu | 7440-53-1 | 10.0 µg/mL | 10.0 µg/mL | 3117a* | Eu ₂ O ₃ | 99.99+ | Tb | 7440-27-9 | 10.0 µg/mL | 9.99 µg/mL | 3157a* | Tb ₂ O ₃ | 99.99+ |
| Gd | 7440-54-2 | 10.0 µg/mL | 9.93 µg/mL | 3118a* | Gd ₂ O ₃ | 99.99+ | Th | 7440-29-1 | 10.0 µg/mL | 10.0 µg/mL | 3159* | Th(NO ₃) ₄ ·4H ₂ O | 99.99+ |
| Ho | 7440-60-0 | 10.0 µg/mL | 10.0 µg/mL | 3123a* | Ho ₂ O ₃ | 99.99+ | Tm | 7440-30-4 | 10.0 µg/mL | 9.92 µg/mL | 3180a* | Tm ₂ O ₃ | 99.99+ |
| La | 7439-91-0 | 10.0 µg/mL | 9.80 µg/mL | 3127a* | La ₂ O ₃ | 99.99+ | Y | 7440-65-5 | 10.0 µg/mL | 9.87 µg/mL | 3187a* | Y ₂ O ₃ | 99.99+ |
| Lu | 7439-94-3 | 10.0 µg/mL | 9.93 µg/mL | 3130a* | Lu ₂ O ₃ | 99.99+ | Yb | 7440-64-4 | 10.0 µg/mL | 9.99 µg/mL | 3186a* | Yb ₂ O ₃ | 99.99+ |
| Nd | 7440-00-8 | 10.0 µg/mL | 9.84 µg/mL | 3135a* | Nd ₂ O ₃ | 99.99+ | | | | | | | |

* - indicates NIST SRM

† - indicates CRM (when NIST SRM is not available)

Purity grades:

Starting Materials: Shown above

Matrix:

 5% HNO₃: HNO₃ (CAS No. 7697-37-2) high purity grade

Traceability:

This standard has been produced gravimetrically and volumetrically using ISO 9001 quality procedures. Agilent ICP / ICP-MS Spectrometer was used to determine the concentration of the main elements via NIST SRMs shown above, as well as the Impurities. Other reference standards used: CL1-79MKB, CL1-40MKB.

Trace Metallic Impurities in the Actual Solution, in µg/L, via Agilent ICP-MS Analysis, results are accurate to ±10%:

| Element | Conc. | Element | Conc. | Element | Conc. | Element | Conc. | Element | Conc. | Element | Conc. |
|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| Ag | <0.1 | Cd | <0.1 | Hg | <0.08 | Nb | <0.2 | Rh | <0.08 | Te | <0.8 |
| Al | 3 | Co | <0.2 | In | <0.02 | Ni | 0.5 | Ru | <0.2 | Tl | <0.3 |
| As | <100 | Cr | <0.7 | Ir | 0.2 | P | <100 | Sb | <0.7 | Tl | <0.4 |
| Au | <0.1 | Ca | 0.04 | K | 30 | Pb | 0.3 | Se | <70 | U | 0.2 |
| B | <1 | Cu | 0.2 | Lj | <0.2 | Pd | <0.4 | Si | <100 | V | <0.02 |
| Ba | 4 | Fe | 11 | Mg | <1 | Pt | <0.04 | Sn | <0.1 | W | <10 |
| Be | <0.2 | Ga | <3 | Mn | <0.9 | Rb | 9 | Sr | 4 | Zn | 10 |
| Bi | 0.1 | Ge | <10 | Mo | <2 | Re | 0.6 | Ta | <10 | Zr | <0.3 |
| Ce | 50 | Hf | <10 | Na | 20 | | | | | | |

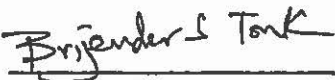
Balances are calibrated regularly with weight sets traceable to NIST.

Density: 1.024 g/mL @ 20°C

Agilent reference standards are guaranteed stable and accurate to ±0.5% of measured analyte concentration. This uncertainty is at 95% confidence interval, a coverage factor of 2. For these solutions we use the highest purity acids applicable, 18 megohm double deionized water and acid-leached, triple rinsed bottles. All glassware used is class A. This standard was manufactured following the guidelines set forth under ISO 17025 and ISO Guide 34 regulations.

Date of release: February 28, 2017

Date of expiration: August 31, 2018


 QC Coordinator