

**Agilent Technologies****SIGMA-ALDRICH®**

### Certificate of Analysis

Description : Amino Acid Standard (0.25 nmol/μl) 10/pk  
Part.-No. : 5061-3331 Production date : 01-Jul 2016  
Lot.-No. : BCBS4356V (99413) Expiration date. : 01 Jul 2018

| No. | Component                             | Molecular Weight | Final Concentration (mg/ml) |
|-----|---------------------------------------|------------------|-----------------------------|
| 01  | L-Alanine                             | 89.10            | 0.02228                     |
| 02  | L-Arginine                            | 174.20           | 0.04355                     |
| 03  | L-Aspartic Acid                       | 133.11           | 0.03328                     |
| 04  | L-Cystine                             | 240.30           | 0.06008                     |
| 05  | L-Glutamic Acid                       | 147.13           | 0.03678                     |
| 06  | Glycine                               | 75.07            | 0.01877                     |
| 07  | L-Histidine Hydrochloride Monohydrate | 209.63           | 0.05241                     |
| 08  | L-Isoleucine                          | 131.18           | 0.03279                     |
| 09  | L-Leucine                             | 131.18           | 0.03279                     |
| 10  | L-Lysine Hydrochloride                | 182.65           | 0.04566                     |
| 11  | L-Methionine                          | 149.21           | 0.03730                     |
| 12  | L-Phenylalanine                       | 165.19           | 0.04130                     |
| 13  | L-Proline                             | 115.13           | 0.02878                     |
| 14  | L-Serine                              | 105.09           | 0.02627                     |
| 15  | L-Threonine                           | 119.12           | 0.02978                     |
| 16  | L-Tyrosine                            | 181.19           | 0.04530                     |
| 17  | L-Valine                              | 117.15           | 0.02929                     |

#### Purity Determination:

Amino acids by Titration, Loss on drying, Residue on ignition, IR-Spectroscopy, MicroSelect-Test, Trace Metal and Trace Anion Determination

Hydrochloric acid by Titration, MicroSelect-Test, Trace Metal and Trace Anion Determination

#### Raw materials

All raw materials used to prepare this amino acid standard are of the highest available purity (> 99%) and are routinely analyzed according to the above-mentioned purity-determinations.

#### Manufacturing

We employ precise measuring techniques in manufacturing this amino acid standard. Mass is determined with electronic balances capable of weighing to 0.0001 g and calibrated by the Swiss Office of Weights and Measures. Volume is determined in dedicated high-purity borosilicate volumetric flasks capable of measuring a 2000 ml-volume with an accuracy of 0.3%.

**Packaging and Storage**

The final solution is handled under argon, filled into 1 ml amber ampoules under inert gas (argon) and sealed. 10 finished ampoules are packaged into a set and stored at 4 °C.

**Stability**

Every individual lot of the product is subjected to reanalysis and the experience allows to set the shelf life to two years, if the product is stored as received at 4 °C. The guaranteed stability is not applicable to ampoules stored after opening, even if resealed.

**Analytical Quality Control**

The scope of the analytical testing procedures covers identity, purity, homogeneity, accuracy, function test in amino acid analysis and stability of the finished product

| Description                | Lot Analysis            | Specifications                      |
|----------------------------|-------------------------|-------------------------------------|
| Aspect                     | clear, colorless liquid | clear, colorless liquid             |
| Density (20/4)             | 1.000                   | 1.00 ± 0.01 g/ml                    |
| Index of Refraction (20/D) | 1.334                   | 1.334 ± 0.005                       |
| Amino Acid Analysis :      | corresponds             | corresponds                         |
| - Identity                 | corresponds             | corresponds                         |
| - Purity                   | corresponds             | corresponds                         |
| - Concentration Accuracy   | corresponds             | ± 2.5% relative to primary standard |

Buchs, 01.07.2016

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