

**Certificate of Analysis**

Description : Amino Acid Standard (0.025 nmol/μl) 10/pk

Part.-No. : 5061-3333

Production date : 12-Dec 2016

Lot-No. : BCBT4332 (99415)

Expiration date : 12-Dec 2018

| No. | Component | Molecular Weight | Final Concentration (mg/ml) |
|-----|---------------------------------------|------------------|-----------------------------|
| 01 | L-Alanine | 89.10 | 0.00223 |
| 02 | L-Arginine | 174.20 | 0.00436 |
| 03 | L-Aspartic Acid | 133.11 | 0.00333 |
| 04 | L-Cystine | 240.30 | 0.00601 |
| 05 | L-Glutamic Acid | 147.13 | 0.00368 |
| 06 | Glycine | 75.07 | 0.00188 |
| 07 | L-Histidine Hydrochloride Monohydrate | 209.63 | 0.00524 |
| 08 | L-Isoleucine | 131.18 | 0.00328 |
| 09 | L-Leucine | 131.18 | 0.00328 |
| 10 | L-Lysine Hydrochloride | 182.65 | 0.00457 |
| 11 | L-Methionine | 149.21 | 0.00373 |
| 12 | L-Phenylalanine | 165.19 | 0.00413 |
| 13 | L-Proline | 115.13 | 0.00288 |
| 14 | L-Serine | 105.09 | 0.00263 |
| 15 | L-Threonine | 119.12 | 0.00298 |
| 16 | L-Tyrosine | 181.19 | 0.00453 |
| 17 | L-Valine | 117.15 | 0.00293 |

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, 12.12.2016

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