

Components of SEASTAR's Certificate of Analysis:

- 1) Product Number: consists of the Product Grade combined with the Product Type. For example, BA-01 refers to BASELINE quality Product Grade, Nitric Acid.
 - a. Product Grade (IQ or BA)
 - i. IQ – Instrument Quality
 - ii. BA – BASELINE
 - b. Product Type: please note that the Product Type, in the Product Number always uses 2 digits as opposed to the Product Type for Lot Number (see 2a below)
 - i. 01 – Nitric Acid
 - ii. 02 – Perchloric Acid
 - iii. 03 – Sulfuric Acid (Sulphuric Acid)
 - iv. 04 – Hydrochloric Acid
 - v. 05 – Hydrofluoric Acid
 - vi. 06 – Acetic Acid (Acetic Acid, Glacial)
 - vii. 07 – Ammonia Solution (Ammonium Hydroxide)
 - viii. 08 – Hydrobromic Acid
 - ix. 09 – Water
 - x. 17 – Hydrogen Peroxide (Hydrogen Peroxide Solution)
- 2) Lot Number: Consists of the Product Grade, Product Type and date. For example, the Lot Number 1205040 is Nitric Acid, BASELINE quality, the year 2005, the 4th month and the first lot for that month.
 - a. Product Type:
 - i. 1 – Nitric Acid
 - ii. 2 – Perchloric Acid
 - iii. 3 – Sulfuric Acid (Sulphuric Acid)
 - iv. 4 – Hydrochloric Acid
 - v. 5 – Hydrofluoric Acid
 - vi. 6 – Acetic Acid (Acetic Acid, Glacial)
 - vii. 7 – Ammonia Solution (Ammonium Hydroxide)
 - viii. 8 – Hydrobromic Acid
 - ix. 9 – Water
 - x. 17 – Hydrogen Peroxide (Hydrogen Peroxide Solution)
 - b. Product Grade (IQ or BA)
 - i. 1 – Instrument Quality
 - ii. 2 – BASELINE
 - c. Year: YY – Numeric, 2 digit, i.e. 05 for 2005
 - d. Month: MM – Numeric, 2 digit, i.e. 04 for April
 - e. Version: N – Numeric, 1 digit, i.e. 0 for the first, 0, 1, 2, 3, ...

- 3) Release Date: The date the Certificate of Analysis was generated.
- 4) Expiry Date: The date when the Certificate of Analysis expires. SEASTAR guarantees all of its product's certified integrity for three years if unopened and sealed under the following conditions:
- Stored at room temperature, maximum range 15⁰C (59⁰F) to 25⁰C (77⁰F).
 - Minimum exposure to light.
 - For limited time, storage/transport temperature range 5⁰C (41⁰F) to 35⁰C (95⁰F)
 - Upon opening the product, the product's integrity will depend on proper handling and exposure to contaminants. The product has been bottled under CLASS 100 clean room conditions, to maintain the certified quality it should be used under these conditions.
- NOTE: under these conditions the products will not degrade and after extensive testing SEASTAR has found that most analytes remain within the specified levels and the product is still usable.
- PRECAUTION: Using Nitric Acid (Concentrated Nitric Acid, 68% w/w, available from SEASTAR as Instrument Quality or BASELINE) as an example. Exposure to light or heat can cause Nitric Acid (HNO₃) to break down to Nitrogen Dioxide (NO₂ – a major component of smog), Nitrogen Dioxide forms an equilibrium with DiNitrogen Tetroxide (N₂O₄). Proper storage and handling is critical when using these products, consult your Material Safety Data Sheet (MSDS).
- 5) Assay: Refers to the concentration of the product and is expressed in terms of **weight percent**. BASELINE Nitric Acid specifications ensure the customer will receive no less than 67% Nitric Acid (weight Nitric Acid/weight of the Solution x100%, w/w%) and no more than 70% Nitric Acid (w/w%)
- 6) Test: we have referred to non instrumental or classical techniques as tests. For example the Assay is determined by titrimetry or titration.
- 7) Analyte: the substance being measured. The principle technique for all the trace metals is Mass Spectrometry (ICP-MS, SEASTAR's instrumentation includes both a high resolution Mass Spectrometer – Finnigan's Element 2 double focusing magnetic sector field ICP-MS as well as a brand new Agilent 7500cs ICP-MS, September 2005 Octopole with a Reaction Cell).
- 8) Maximum Specification: the maximum certified value of an analyte. BASELINE Nitric Acid certifies or guarantees that Iron (Fe) will contain no more than 20 ppt (parts per trillion or 20 pg/g, 20pg of Fe within 1 g of solution)
- 9) Actual Value: the measured value in a particular lot analysis

- 10) Unit(s): ppm – part per million or μg (microgram) of analyte per gram of solution, ppb – part per billion or ng (nanogram) of analyte per gram of solution, ppt – part per trillion or pg (picogram) of analyte per gram of solution
- 11) Conditional Statement: Instrument Quality products are analyzed at the point of bottling, hence prior to storage in the packaging material (mainly glass or polyethylene bottles). BASELINE products are analyzed in their packaging material (most products are packaged in specially manufactured Teflon Bottles, followed by extensive surface leaching. This results in very little change from stored product to packaged product. SEASTAR certifies the BASELINE packaged product. Both products are guaranteed, the IQ statement mentions analytes affected by the packaging material. These analytes may rise above the certified value. If these analytes are critical in your application/analysis it is recommended to use the BASELINE product for such analytes.
- 12) Grade: SEASTAR produces two main product lines, Instrument Quality and BASELINE. Both products certify approximately 60 trace metals, the Instrument Quality product is used with most trace metal applications certified values of most analytes being 1ppb or 0.5ppb. The BASELINE is for our most demanding customers or our premium grade. Most trace metals are below 100ppt with critical environmental metals certified in the 10 and 20ppt range.